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BLOOD-CELL COUNTING: A SERIES OF OBSERVATIONS WITH THE HÉMATIMÈTRE OF MM. HAYEM AND NACHET, AND THE HÆMACYTOMETER OF DR. GOWERS.

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VARIOUS instruments have been devised for a more accurate diagnosis of blood diseases than can be made by a mere observation of the symptoms of these affections. Such symptoms are all secondary, and are mostly due to imperfect nutrition of the nervous and muscular systems, imperfect oxidation, and vitiated secretion. In different cases one set of symptoms may be so prominent as to obscure all the others, and in any case symptoms due to a local affection may be confounded with those due to a general blood disease. In many cases nothing but a numeration of the blood cells can even determine the existence of an anæmia, and perhaps in no case can any other method distinguish its precise variety.

The instruments used for this purpose are all constructed upon the same principle, the different modifications being such as are designed to facilitate the rapid counting of the cells, and the easy reckoning of their percentage as compared with the standard of health. A known quantity of blood is diluted with a known quantity of fluid, and in a cell of a certain depth and superficies — the latter determined by squares of a certain size ruled upon the eye-piece of the microscope, or on the bottom of the cell containing the blood — the number of corpuscles is counted. With these factors, — the depth of the cell, its superficies, and the amount of the dilution, — the number of corpuscles in a cubic millimetre of blood is readily estimated. It is self-evident that the more the blood is diluted, the easier is the counting of the corpuscles, and the longer the subsequent calculation.

The most recent of these modified instruments is that of Dr. Gowers, of London. The following description of the instrument and its use is

taken from an article by Dr. Gowers in the *Lancet* for December 1, 1877: —

"The hæmacytometer consists of (1) a small pipette, which, when filled to the mark on its stem, holds exactly 995 cubic millimetres. It is furnished with an india-rubber tube and mouth-piece to facilitate filling and emptying. (2.) A capillary tube marked to contain exactly five cubic millimetres, with india-rubber tube for filling, etc. (3.) A small glass jar in which the dilution is made. (4.) A glass stirrer for mixing the blood and solution in the glass jar. (5.) A brass stage plate carrying a glass slip, on which is a cell, one fifth millimetre deep. The bottom of this is divided into one-tenth-millimetre squares. Upon the top of the cell rests the cover glass, which is kept in its place by the pressure of two springs proceeding from the ends of the stage plate. . . .

"The mode of proceeding is extremely simple. Nine hundred and ninety-five cubic millimetres of the solution are placed in the mixing jar; five cubic millimetres of blood are drawn into the capillary tube from a puncture in the finger, and then blown into the solution. The two fluids are well mixed by rotating the stirrer between the thumb and finger, and a small drop of this solution is placed in the centre of the cell, the covering glass gently put upon the cell and secured by the two springs, and the plate placed upon the stage of the microscope. The lens is then focused for the squares. In a few minutes the corpuscles have sunk to the bottom of the cell, and are seen at rest on the squares. The number in ten squares is then counted, and this multiplied by ten thousand gives the number in a cubic millimetre of blood.

"The average of healthy blood was decided by Vierordt and Welcker to be five million per cubic millimetre, and later results agree with this sufficiently nearly to justify the adoption of this number as the standard, it being remembered that in a healthy adult man the number may be a little higher, in a woman a little lower. The number per cubic millimetre is the common mode of stating the corpuscular richness of the blood, but by employing this dilution and squares of this size a much more convenient mode of statement is obtained. Taking five million as the average per cubic millimetre for healthy blood, the average number in two squares of the cell is one hundred. These two squares contain .00002 cubic millimetre of blood, and it is proposed to take this quantity as the 'hæmic unit.' The number per hæmic unit, that is, in two squares (ascertained by counting a larger number, ten or twenty, and taking the mean), thus expresses the percentage proportion of the corpuscles to that of health, or, made into a two-place decimal, the proportion which the corpuscular richness of the blood examined bears to healthy blood taken as unity. This is a much more simple method than any hitherto used. The proportion of white corpuscles to the red, or their number per hæmic unit, is best ascertained by observ-

ing the number of squares visible in the field of the microscope, and noting the number of white corpuscles in a series of ten or twenty fields. The number of red corpuscles corresponding to the ten or twenty fields is easily computed, and thus the proportion of white to red is ascertained. The normal *maximum* of white per two squares (hæmic unit) is three."

We each obtained one of these hæmacytometers at about the same time, and, with the object of testing the instruments, began a series of observations upon our own blood, preliminary to a proposed series of observations as to the effect of certain drugs. We soon discovered that the two instruments behaved very differently. Suspicion was first aroused in the following manner: One of us had examined the blood of a hospital patient suffering with intermittent fever, who had been selected for experiment on account of his sallow and anæmic appearance, and the absence of any perceptible enlargement or disease of spleen, liver, or any of the hæmoprietic organs. It was a case in which the results of appropriate treatment would probably be speedily manifested, and especially through an increase of the red blood cells.

The first count was made on October 3d, at 12.30 P. M. Ten squares were counted with the following result: number of red cells per c. mm., 3,420,000; percentage proportion to healthy blood, $68\frac{4}{10}$; number of white cells in the ten squares, seven.

The second count was made on October 7th, and this time twenty squares were counted: number of red cells per c. mm., 2,675,000; percentage proportion to healthy blood, $53\frac{1}{2}$; number of white cells counted in the twenty fields, two.

As the man had had no return of the ague since September 30th, and had improved in strength to such an extent that he was anxious to leave the hospital and return to his occupation, this result very naturally caused considerable astonishment. The care taken to prevent error in manipulation was so great that it was impossible to attribute it to that source. It was very soon ascertained, however, that the cell used at this examination was not the same as at the first observation.

In working together we had, unintentionally, exchanged cells. On October 15th we took the two cells to Mr. Zentmayer, and had them measured. It was then ascertained that there was a difference in depth between the two of $\frac{1}{400}$ inch, the shallower one having been used at the latter of the two observations just referred to.

One cell measured $\frac{5}{800}$ inch deep, the other $\frac{7}{800}$ inch. The cells ought to be $\frac{1}{5}$ millimetre deep, or, taking the millimetre as $\frac{1}{25}$ inch, $\frac{1}{125}$ inch. Neither of them, therefore, was accurate, one being $\frac{1}{160}$ inch deep, the other about $\frac{1}{114}$. The next thing to be done was to determine, by a series of observations, to what extent the results obtained by the two cells varied. Mathematically, they were to each other as five to seven; that

is, there should be between them a difference of forty per cent. In counts of the same blood, made with the two instruments, that is, of diluted blood taken from the mixer at the same time, no such difference of results was ever observed, the utmost variation being eighteen per cent., the least $11\frac{4}{10}$ per cent., the average $14\frac{7}{10}$ per cent. Our experience goes to show that undue importance has been attached to the depth of the cell in these instruments. There are other factors in the calculation of so much greater importance as to cause this one to assume a decidedly subordinate position. These sources of error may be inferred when we come to state the precautions we have taken to avoid them. Suffice it to say here that the effect of gravity upon the blood corpuscles is the same in cells of all depths. In Dr. Keyes's article on Mercury in the Treatment of Syphilis, which was originally published in January, 1876, he remarks that for "accurateness of results the glass cells must be absolutely equal in depth. . . . There is a difference of about $\frac{1}{50}$ millimetre between my cell and one in the possession of Dr. Stimson. There is a uniform difference of about ten per cent. in the count of the same blood in the different cells."

This difference, ten per cent., is exactly what one would expect to find *a priori*, mathematically. After our cells were measured we expected to find, upon mathematical grounds, a difference between them of forty per cent., and suffered about twenty-five per cent. of disappointment. The only explanation of these discrepancies that we would suggest is that, *up to a certain point*, the depth of the cell has a direct and regular influence upon the result; beyond this point, the depth of the cell is a matter of minor consideration. If the cell were *filled* with blood, the depth would always affect the result, but this is never the case; a drop of diluted blood is deposited upon the slide, the glass cover laid upon the drop, with its edges resting upon ground glass to prevent evaporation; the moment the diluted drop is placed upon the slide its contained corpuscles begin to gravitate with great rapidity, and as the drop is generally of nearly uniform size, and as, whether larger or smaller, it rises to the same height above the level of the glass, the depth of the cell can only determine the amount of pressure made by the cover glass upon the liquid; the deeper the cell the less the pressure, and *vice versa*. The corpuscles have, through gravity, a tendency to assume a certain arrangement, which tendency is not to be overcome, but merely interfered with, by pressure from any direction. Of two cells holding a drop of diluted blood, in the deeper the pressure of the cover glass will exert the least influence, and will be directly applied to a layer of fluid containing comparatively few corpuscles, perhaps none whatever. The effect of this pressure is chiefly to spread this clearer stratum of fluid over the corpuscles, and not to deflect these from their perpendicular descent. Our statement that up to a certain

point the varying depth of the cells influences the number of corpuscles in the field, while beyond this point the depth exerts no appreciable influence is, as we have endeavored to show, founded upon correct principles. The undue importance ascribed to the depth of the cell by many observers arises, we think from the fact that they have not constantly borne in mind that they were not dealing with a homogeneous fluid.

In order to estimate the value of blood counting as a method of diagnosis and a guide to therapeutics, we have preserved records of sixty-three counts, thirty-five of these with Gowers's hæmacytometer, the remainder with that of Hayem and Nachet. The counts may be divided into two series: in the first series no particular attention was paid to the cover glass used, one being, at each observation, selected at random from a number that accompanied the instruments. Having found a great variation in the different observations, and with the object of making the conditions of each count identical, a cover glass was selected as free from blemish as possible, and the same side was always applied to the fluid. This was accomplished by marking the side that was kept uppermost, and this mark was invariably placed in the same position. Finally, to insure still greater accuracy, one of us had a cover glass *ground* by Mr. Zentmayer, and this glass was also used with the same precautions. It is unnecessary to dilate upon the importance of using the same cover glass in the same position. All practical microscopists are well acquainted with the flaws and curves of these glasses, and it will be at once conceded that if, in such extremely delicate work as blood counting, at one observation the convex side of a glass be applied to the blood, and at another time the concave side, the discrepancies resulting therefrom may be very great.

When all is told, however, the great source of inaccuracy is in the *measurement* of the blood and the diluting fluid. By counting a great number of squares any inequality in the distribution of the corpuscles may be compensated for to a great extent, but in two successive measurements and counts of the same blood we have found an extreme variation of 790,000 per c. mm. The observations giving this extreme variation were made in rapid succession, and the measurements corroborated by both of us; they appeared absolutely correct in both instances. One result of our observations, therefore, is that no one measurement of blood can be relied upon as trustworthy, no matter how great a number of squares be counted, but that at least two should be made, more if possible, especially if any therapeutic inductions are to be drawn from the facts observed. Keyes has found a difference of two hundred thousand to the c. mm. in different parts of the same field, and we, in double the number of ***physiological*** counts recorded in his paper, have observed still wider variations; and when to this source of error arising from irregular distribution is added the vastly greater one arising from the measurements, no matter how carefully made, it will at once be

perceived that a difference of five hundred thousand to the c. mm. is by no means a great one. If this difference should happen to be in the direction of excess while the patient is taking a certain drug, the increase is naturally attributed to the medicine, and *vice versa*. Again, we repeat that averages both of counts and measurements, but especially of the latter, are absolutely necessary in order even to approach an accurate result. A single measurement, with a count of five, ten, or twenty squares, we consider almost worthless. Its sole value consists in that it contributes to form an average.

Although our observations were made with the view of testing the accuracy of the instruments employed in blood counting, yet, as they were physiological, neither of us having had a day's sickness since they were begun, they possess a certain value for determining the normal number of red cells per millimetre. This is variously stated by authors. Vierordt, the first worker in this field, whose method was very uncertain, consisting in spreading blood diluted with a gummy solution upon a slide, allowing it to dry, and then counting the cells by means of a micrometer placed directly upon it, gives the number for his own blood as 5,174,000; Welcker states it for himself as 4,600,000; Cramer as 4,726,000; and Malassez indicates 4,000,000 as the average of the blood of man. Gowers adopts a standard of 5,000,000, but states that "in a healthy adult man the number may be a little higher, in a woman a little lower." Keyes thinks the standard of 5,000,000 rather high. We, on the contrary, have found it too low. For one of us, the average of twenty-one counts gives 5,566,272.5; for the other, twenty-six counts give an average of 5,935,862.5, the difference seeming to depend upon weight and size. That the number given by Malassez is absurdly low is presumptively proved by the following facts. In the *Gazette hebdomadaire* for May 7, 1875, is the report of a lecture on blood counting by M. Hayem, which, besides containing an excellent short bibliographical *résumé* of the subject, gives the report of a case of a profoundly anæmic individual suffering with malarial cachexia and gangrene of the mouth, whose blood contained 3,312,500 red globules per c. mm. If the blood of a person in such a condition contained more than 3,000,000 cells to the c. mm., the number of 4,000,000 is certainly too low a standard for health. In the same lecture M. Hayem remarks that he has never, even in extreme anæmia, found less than 3,000,000 cells per millimetre, although in a foot-note he adds that since the lecture was delivered his assistant, M. Dupérié, had found in two hospital patients in his service "a number of globules somewhat less than 3,000,000." What, then, are we to think of an examination giving as its result 1,000,000 to the c. mm.? We cannot but regard such a condition of aglobulia as incompatible with life.

The next five counts have been placed in a separate series, on account of the manner in which the blood was taken from the finger.

All modern writers upon the subject of blood counting recommend that the finger be so punctured as to cause the blood to flow with the slightest possible pressure. Although not so stated, as far as we are aware, it is supposed that this recommendation is founded upon the presumption that any great amount of pressure would dilute the blood with fluid effused from the smaller veins and squeezed out of the lymph spaces. Writers are accustomed to describe their favorite kind of needle for making the puncture. Following their advice in making the counts above recorded, we punctured our fingers so that the blood generally began to flow spontaneously, and then applied the slight pressure requisite to obtain the amount needed. In the five following counts, in order to test the question whether too great stress has not been laid upon this point, the finger was ligatured by winding a cord around it several times, tightly enough to compress the veins, but not to impede the arterial flow; and after it had been *in situ* for one minute, a very slight puncture was made, and forcible pressure applied to the swollen and congested finger pulp. The details of these counts are given below. They were all of B's blood, and their average compared with the average of the same blood obtained in the ordinary way is only a little over 100,000 less, an amount not worth considering. It will also be observed that they are the most even series of counts that we have made, the difference between the lowest, 5,730,000, and the highest, 6,155,000, being 425,000. These two counts were made at an interval of twenty-four hours.

FIRST SERIES WITH GOWERS'S INSTRUMENTS A AND B,

With *Unselected Cover Glasses.*

		1	2	3	4	5	6	7	8	9	10		
B's blood.	Sept. 30, 6.00 P. M.	63	54	55	67	63	61	57	61	73	54	= 6,080,000 per cub. mm.	Instrument B.
	Oct. 1, 6.00 P. M.	57	60	60	42	70	50	52	53	54	44	= 5,420,000 per cub. mm.	Instrument B.
	Oct. 1, 6.00 P. M.	59	49	48	42	52	49	38	50	49	54	= 4,900,000 per cub. mm.	Instrument B.
	Oct. 5, 9.30 A. M.	52	63	56	57	68	68	63	55	51	60	= 5,930,000 per cub. mm.	Instrument B.
	Oct. 7, 10.30 A. M.	51	59	65	50	62	50	56	56	68	63	= 5,800,000 per cub. mm.	Instrument A.
	Oct. 7, 10.30 A. M.	61	71	60	59	59	67	63	61	64	62	= 6,270,000 per cub. mm.	Instrument B.
	Oct. 12, 6.00 P. M.	48	50	66	61	59	54	48	44	50	47	= 5,270,000 per cub. mm.	Instrument A.
	Oct. 14, 5.30 P. M.	61	62	58	57	46	54	47	49	56	69	= 5,590,000 per cub. mm.	Instrument B.
	Oct. 14, 9.30 P. M.	56	63	58	68	61	53	50	57	63	58	= 5,870,000 per cub. mm.	Instrument B.
A's blood.	Oct. 7, 9.00 A. M.	64	60	63	62	64	64	63	71	62	70	= 6,430,000 per cub. mm.	Instrument A.
	Oct. 7, 9.00 A. M.	71	63	77	63	53	68	66	74	79	71	= 6,850,000 per cub. mm.	Instrument A.

Average for B's blood, with both instruments, per cub. mm. = 5,681,111.
Average for B's blood, with Instrument A, per cub. mm. = 5,535,000.
Average for B's blood, with Instrument B, per cub. mm. = 5,722,857.
Average for A's blood, with Instrument A, per cub. mm. = 6,640,000.

SECOND SERIES WITH GOWERS'S INSTRUMENT,

A *Selected Cover Glass* being used with Instrument B, and one *carefully ground* with Instrument A.

		1	2	3	4	5	6	7	8	9	10	Differ. t days.	
A's blood.	10.15 A. M.	60	61	59	55	57	46	44	59	54	63	5,580,000	With Instrument A.
	4.00 P. M.	50	58	62	54	44	43	51	60	51	59	5,320,000	
	9.15 A. M.	48	60	49	50	53	43	57	56	49	59	5,240,000	

		1	2	3	4	5	6	7	8	9	10			
B's blood.	4.00 P. M.	62	64	50	58	53	55	54	62	59	49	Same day.	5,660,000	Instrument A. Same dilution in both cases.
	4.00 P. M.	48	67	58	67	72	60	64	70	62	67		6,350,000	Instrument B.
A's blood.	5.00 P. M.	49	55	63	55	51	61	55	55	46	46	Same day.	5,360,000	Instrument A.
	5.00 P. M.	56	59	58	56	58	70	66	56	76	59		6,140,000	Instrument B.
A's blood.	10.30 A. M.	59	48	53	58	52	67	50	57	50	57		5,510,000.	Instrument A.
	3.20 P. M.	48	50	59	50	47	45	52	55	55	58		5,190,000.	Instrument A.
	10.15 A. M.	55	68	65	61	60	57	52	49	51	45		5,630,000.	Instrument A.
	10.45 A. M.	59	45	57	64	50	57	53	56	54	65		5,500,000.	Instrument A.
B's blood.	4.15 P. M.	61	46	54	39	51	50	65	55	47	60	Same day.	5,080,000.	Instrument A. Same dilution used.
	4.15 P. M.	56	53	65	73	55	67	61	52	58	58		5,980,000.	Instrument B.
B's blood.	9.30 A. M.	54	58	63	61	65	48	60	46	54	72		5,810,000.	Instrument B.
B's blood.	9.45 A. M.	63	54	65	49	60	61	59	60	63	54		5,880,000.	Instrument B.
A's blood.	6.00 P. M.	56	46	38	45	53	36	58	59	49	46		4,860,000.	Instrument A. After loss of night's rest and prolonged physical exercise with little food.
B's blood.	10.30 A. M.	55	53	52	63	64	70	57	63	64	63		6,040,000.	Instrument B.
B's blood.	10.45 A. M.	59	57	50	50	61	65	54	65	56	48		5,650,000.	Instrument B.
B's blood.	10.15 A. M.	70	69	63	59	54	63	54	53	69	59		6,130,000.	Instrument B.
B's blood.	8.00 P. M.	65	65	58	64	63	60	76	62	63	62		6,380,000.	Instrument B.
B's blood.	8.00 P. M.	73	61	63	60	54	56	64	58	57	51		5,970,000.	Instrument B.
B's blood.	4.45 P. M.	61	58	73	67	71	62	73	72	69	66		6,720,000.	Instrument B.
B's blood.	10.15 A. M.	51	54	56	44	46	50	52	42	61	60		5,160,000.	Instrument B.
B's blood.	11.15 A. M.	49	39	47	53	52	42	39	49	57	50		4,770,000.	Instrument B.

Average for A's blood, with both instruments, per cub. mm.	5,433,000.
Average for A's blood, with Instrument A, per cub. mm.	5,354,444.
One count of A's blood, with Instrument B, per cub. mm.	6,140,000.
Average for B's blood, with both instruments, per cub. mm.	5,827,142.
Average for B's blood, with Instrument A, per cub. mm.	5,370,000.
Average for B's blood, with Instrument B, per cub. mm,	5,903,333.
Percentage variation of the two instruments on first trial,	11.4.
Percentage variation of the two instruments on second trial,	13.8.
Percentage variation of the two instruments on third trial,	15.6.
Percentage variation of the two instruments on fourth trial,	18.
Average percentage variation of the two instruments	14.7

NACHET'S INSTRUMENT WITH SELECTED, OR GROUND, COVER GLASS.

Nov. 3, 5.30 P. M. A's blood.	12	15	18	13	19	17	15	12	17	19	12	13	16	11	16	13	238	Average per c. mm. 6,080,000.
	9	18	11	14	12	16	14	15	17	14	17	15	20	11	13	18	234	
	11	12	17	15	16	12	17	15	16	17	11	14	14	13	15	14	262	
	18	18	18	19	14	21	23	14	18	16	23	11	12	12	17	16	262	
	16	14	18	12	15	19	15	13	15	18	14	16	17	17	17	17	253	
Nov. 5, 10.30 A. M. A's blood.	17	17	14	18	15	21	15	15	18	13	12	10	16	18	20	14	242	Average per c. mm. 6,370,000,
	24	14	11	20	16	16	12	17	12	17	16	19	19	14	15	14	243	
	18	16	16	16	16	17	20	14	16	19	16	19	15	19	20	16	256	
	16	21	11	15	17	21	15	17	13	16	11	17	14	14	14	14	272	
	18	15	13	16	15	15	15	18	20	13	14	12	21	13	20	19	257	
Nov. 5. 3.10 P. M. A's blood.	18	16	12	15	14	16	11	15	12	16	16	14	12	12	12	18	229	Average per c. mm. 5,720,000.
	16	16	11	17	15	14	14	14	15	14	14	9	13	14	11	15	222	
	11	9	15	20	13	16	13	13	15	11	12	11	18	7	10	12	206	
	16	15	16	11	15	15	12	14	21	11	18	13	17	20	16	19	249	
	20	15	16	17	15	11	15	16	10	16	15	19	16	10	13	14	238	
Nov. 5, 5.30 P. M. B's blood.	15	13	13	18	14	15	18	16	15	15	19	16	23	16	12	14	252	Average per c. mm. 6,285,000.
	16	16	20	11	13	16	19	17	22	17	14	20	20	21	17	19	278	
	12	18	19	14	17	16	10	19	16	17	17	15	14	13	13	19	249	
	17	13	17	18	13	21	14	16	12	16	13	14	12	15	18	14	243	
	16	13	16	16	14	12	21	12	22	11	13	13	15	13	13	15	235	
Nov. 5, 6 P. M. B's blood.	14	14	14	21	15	11	12	16	10	11	10	10	15	13	13	19	218	Average per c. mm. 6,145,000. A trace of blood remained in pipette, making it hardly a fair count.
	15	15	7	10	15	14	14	11	15	8	16	13	13	15	25	12	228	
	16	17	13	13	11	16	11	16	14	12	16	15	14	9	15	12	220	
	19	12	20	14	14	7	14	18	12	14	13	18	11	8	18	13	225	
	18	15	22	13	12	18	17	12	12	15	12	18	13	12	15	14	238	
Nov. 6, 4.45 P. M. B's blood.	12	12	12	10	12	18	13	19	16	7	16	16	16	13	14	14	220	Average per c. mm. 5,450,000.
	16	11	16	10	16	16	15	12	14	15	18	8	12	14	13	15	221	
	13	18	14	13	11	13	14	10	15	15	9	21	13	13	8	16	216	
	13	11	12	15	14	14	13	19	14	17	10	9	9	14	11	17	212	
	12	12	13	13	11	15	17	14	20	11	14	16	12	18	9	14	221	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
	12	12	16	15	15	15	12	18	12	16	12	14	16	11	17	13	226	
Nov. 6,	10	11	19	9	14	12	11	16	10	12	15	14	12	14	14	8	201	
5.15 P. M.	14	18	18	13	14	10	18	16	16	14	11	16	14	16	12	15	235	Average per c. mm.
A's blood.	14	17	15	15	15	17	16	15	9	14	12	12	14	12	10	18	225	5,620,000.
	12	14	21	12	20	15	15	18	13	11	20	19	13	12	16	10	241	
	18	17	16	14	15	18	20	16	17	17	21	22	16	17	18	17	279	
Nov. 4,	17	15	10	16	13	16	17	13	15	12	6	16	16	13	12	15	222	
10.30 A. M.	12	22	21	15	12	13	14	12	15	16	16	21	16	15	15	12	247	Average per c. mm.
B's blood.	21	15	14	16	17	12	18	17	19	17	25	12	15	13	15	19	267	6,190,000.
	14	12	19	21	12	15	14	10	18	13	17	17	18	12	12	9	233	
	21	17	11	24	20	16	14	15	14	13	14	13	17	13	13	15	250	
Nov. 4,	16	16	12	14	11	13	16	16	14	21	11	13	16	16	10	9	224	
5.30 P. M.	18	18	16	18	19	16	21	14	17	11	14	11	13	13	15	18	252	Average per c. mm.
B's blood.	17	19	12	14	19	18	12	15	15	18	22	20	12	11	5	12	241	5,865,000.
	Details of fifth square missing, but result recorded.																206	
	21	12	16	15	15	15	12	18	12	16	12	14	16	11	17	13	236	
Nov. 6,	10	11	19	9	14	12	11	16	10	12	15	14	12	14	14	8	201	
5.30 P. M.	14	18	18	13	14	10	18	16	16	14	11	16	14	16	12	15	235	Average per c. mm.
A's blood.	14	17	15	15	15	17	16	15	9	14	12	12	14	12	10	18	225	5,690,000.
	12	14	21	12	20	15	15	18	13	11	20	19	13	12	16	10	241	
	18	20	19	15	18	14	10	21	16	16	24	18	11	18	11	16	265	
Nov. 7,	17	20	17	19	9	15	16	21	16	16	16	11	18	14	10	21	256	
11.30 A. M.	12	14	18	17	19	20	24	16	14	12	12	18	22	14	17	14	263	Average per c. mm.
B's blood.	14	14	16	10	8	7	13	21	17	11	13	9	16	11	16	14	210	6,195,000.
	14	13	15	14	17	15	13	24	20	7	12	13	20	17	12	19	245	
	14	16	13	13	16	18	12	17	15	16	12	12	11	19	13	15	232	
Nov. 7,	18	15	10	16	10	18	12	15	14	13	13	9	11	17	13	14	218	
4 30 P. M.	13	9	17	16	12	9	15	10	12	11	16	13	13	13	10	10	199	Average per c. mm.
A's blood.	14	15	16	11	13	12	15	14	13	12	14	14	15	16	10	11	215	5,340,000.
	15	17	16	11	9	9	14	13	14	12	12	15	11	14	11	11	204	
	16	13	14	17	24	18	18	20	16	18	16	13	14	15	13	20	265	
Nov. 7,	15	17	21	16	10	20	20	19	14	12	16	16	13	17	22	14	262	
5.30 P. M.	17	11	21	23	18	13	12	14	12	17	9	12	13	15	17	12	235	Average per c. mm.
A's blood.	15	16	23	14	19	14	16	14	14	10	13	8	18	10	10	13	227	6,130,000.
	13	10	14	18	10	16	17	18	14	18	16	16	15	11	14	17	237	
	15	15	16	18	12	7	17	9	10	9	17	17	9	19	10	8	208	
Nov. 8,	18	19	18	13	14	15	12	14	11	12	17	15	14	14	13	12	231	
10.45 A. M.	14	15	14	17	16	11	16	11	11	12	13	18	16	15	16	14	229	Average per c. mm.
A's blood.	15	17	11	15	16	15	11	19	11	15	14	16	18	16	19	12	240	5,780,000.
	18	11	15	15	18	14	18	15	18	12	21	14	20	11	13	15	248	
	11	19	14	20	11	17	14	17	11	17	18	13	18	12	8	20	240	
Nov. 12,	17	11	17	16	11	13	17	13	16	15	15	15	12	13	20	12	233	
12 M.	9	13	16	12	14	14	11	12	14	10	14	15	17	14	12	17	214	Average per c. mm.
B's blood.	23	15	16	14	10	18	14	13	12	18	15	16	8	10	13	14	229	5,640,000.
	16	15	14	13	18	14	10	12	12	14	12	10	14	12	13	13	212	
	16	12	7	17	16	16	11	16	6	16	11	16	10	10	16	11	207	
Nov. 12,	14	12	11	10	12	17	15	10	18	13	17	13	12	13	10	15	212	
1 P. M.	13	13	11	15	15	8	7	13	11	11	17	14	14	13	9	12	196	Average per c. mm.
A's blood.	15	14	11	13	16	15	13	15	9	10	14	8	12	10	9	14	198	5,195,000.
	18	15	15	16	13	15	14	9	11	11	16	13	13	14	18	15	226	
	10	12	18	7	11	14	13	16	13	12	12	8	11	10	8	10	185	
Nov. 13,	13	14	13	18	13	11	13	10	7	11	16	16	12	13	5	13	198	
A's blood.	12	10	13	13	11	7	15	10	20	15	12	10	15	15	9	15	202	Average per c. mm.
Time not	16	13	15	18	12	14	16	11	13	14	14	15	15	10	14	9	219	5,100,000.
recorded.	12	10	15	11	14	16	14	14	15	10	14	15	15	17	13	11	216	
	14	16	17	12	17	9	12	17	13	13	9	8	21	12	7	12	209	
	14	13	14	20	18	12	13	17	11	13	15	8	18	10	18	12	226	
A's blood.	10	13	13	14	15	12	16	14	14	20	17	15	15	19	13	12	232	Average per c. mm.
	13	19	14	19	13	16	19	17	18	12	18	17	16	11	16	12	250	5,670,000.
	14	17	12	14	12	14	18	15	16	12	8	16	11	11	14	13	217	
	16	14	10	17	17	13	11	16	15	12	15	11	15	10	13	9	214	
Nov. 14,	18	15	13	11	11	11	12	13	20	19	16	13	17	15	14	14	232	
11.45 A. M.	16	16	15	13	7	14	15	13	14	19	11	12	9	19	9	12	214	Average per c. mm.
B's blood.	13	16	8	16	11	17	11	15	12	17	14	10	21	19	7	18	225	5,525,000.
	14	18	14	17	12	11	14	16	8	17	12	13	13	16	9	16	220	
	18	18	12	13	15	19	19	18	20	20	14	17	12	12	15	11	253	
Nov. 15,	18	15	12	10	18	10	18	14	12	15	16	16	15	8	15	18	230	
11 A. M.	13	20	18	15	16	20	21	15	14	21	15	8	8	14	12	10	240	Average per c. mm.
B's blood.	16	20	14	18	18	20	18	11	19	18	17	15	18	19	13	23	277	6,140,000.
	15	9	14	18	13	18	11	16	14	14	12	21	12	16	11	14	228	
	13	13	18	12	14	21	21	11	12	20	16	13	13	14	16	10	237	
Dec. 18,	14	18	16	14	21	23	17	15	20	19	12	23	10	17	15	19	273	
10 A. M.	16	17	21	17	21	18	26	15	19	12	16	21	15	15	21	13	283	Average per c. mm.
B's blood.	14	10	20	15	16	17	13	16	14	19	11	15	14	15	16	16	241	6,550,000.
	17	15	18	17	10	20	19	18	16	21	15	19	20	15	15	21	276	
	21	16	19	14	18	14	18	14	12	13	13	18	21	16	21	18	266	Average per c. mm.
Dec. 18,	20	15	18	15	10	23	23	15	21	17	14	14	18	17	15	17	272	6,370,000.
11.15 A. M.	21	19	11	17	16	15	15	14	20	18	17	12	21	14	17	16	263	For two weeks pre-
B's blood.	14	19	20	18	16	16	17	11	14	16	14	19	18	13	16	13	244	vious to last two
	11	18	12	15	7	18	14	12	13	19	16	15	13	17	14	15	229	counts, had been
	16	20	18	14	12	17	13	19	13	19	14	12	20	14	14	16	251	taking protochlo-
Dec. 26,	14	18	19	14	19	14	24	15	14	12	11	19	15	13	12	16	249	ride of iron pills.
4.50 P. M.	17	12	20	14	11	15	14	16	8	16	19	18	15	15	23	12	245	
B's blood.	14	14	19	16	19	14	19	15	17	16	12	14	12	14	13	19	247	Average per c. mm.
	17	13	17	22	15	13	13	16	20	16	14	17	13	10	11	17	244	6,180,000.

Average for A's blood (11 counts) per cubic mm. 5,699,545.

Average for B's blood (12 counts) per cubic mm. 6,044,583.

SERIES OF COUNTS OF BLOOD OBTAINED WITH EXTREME PRESSURE.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Dec. 26, 5.10 P. M. B's blood.	11	13	17	15	19	11	16	19	21	22	20	20	16	16	17	18	271	Average per c. mm. 5,895,000.
	12	18	14	9	15	13	16	14	13	12	11	15	16	18	17	10	223	
	14	15	8	16	15	18	8	8	15	14	9	13	16	18	12	16	215	
	19	12	12	14	13	8	10	11	11	17	16	14	13	8	15	12	205	
	20	21	17	13	12	20	21	13	15	12	18	17	20	13	20	13	265	
Jan. 2d, 5.10 P. M. B's blood.	14	18	13	14	15	16	12	17	15	14	17	16	20	11	11	17	240	Average per c. mm. 6,020,000.
	13	19	16	14	15	15	16	9	11	16	17	14	16	10	16	12	229	
	17	12	17	13	14	16	19	15	18	17	14	14	16	16	15	17	250	
	16	16	15	21	14	19	13	18	19	12	14	13	11	6	16	17	240	
	15	15	16	13	12	19	18	16	22	9	16	22	12	18	12	10	245	
Jan. 6, A. M. B's blood.	19	15	17	17	18	22	21	15	17	13	14	16	12	18	15	13	262	Average per c. mm. 6,155,000
	18	18	16	15	15	10	15	14	14	12	16	19	9	18	20	11	240	
	14	15	18	16	10	12	19	16	23	19	18	22	16	17	14	10	259	
	16	16	14	13	14	13	18	14	16	11	17	14	20	13	14	18	241	
	16	15	15	17	13	14	13	11	15	14	19	14	13	12	13	15	229	
Jan. 6, 8.30 P. M. B's blood.	15	18	12	17	12	17	14	19	13	11	15	10	16	8	23	11	231	Average per c. mm. 5,905,000.
	16	9	11	15	17	15	22	16	13	18	19	8	14	15	16	15	239	
	22	19	12	15	11	16	9	11	9	20	20	9	16	17	17	13	236	
	13	14	17	15	10	12	22	14	17	21	12	16	20	12	14	21	250	
	16	15	13	20	13	15	18	11	11	14	15	11	14	17	11	11	225	
Jan. 7, 8 P. M. B's blood.	17	13	12	18	14	18	13	13	9	16	18	9	15	11	14	18	228	Average per c. mm. 5,730,000.
	13	15	13	15	18	15	7	23	11	19	15	11	8	19	16	16	234	
	14	13	15	11	13	13	11	19	15	17	11	17	15	11	12	13	220	
	22	16	18	17	8	16	13	14	16	15	16	15	15	16	13	11	241	
	10	14	14	9	12	14	11	18	16	14	15	17	18	15	16	10	223	

Average of the above five counts per c. mm. . . . . 5,941,000.

In the preceding tables we have given the counts in full, in order that those interested in this subject may be able to judge of the widely varying details upon which the averages are founded. In no other way can the clinical value of blood-cell counting be fairly estimated in its application to individual cases, and it is this application alone in which the general medical profession is interested. We would particularly emphasize our opinion that a mere statement of results, to the exclusion of details, is calculated to mislead. In the first Gowers series of counts, those made with unselected cover glass, there are recorded two counts of A's blood, with instrument A, giving an average of 6,640,000 per c. mm. Exception may possibly be taken to this large average as due to inaccurate measurements, although we have every reason to believe the measurements correct, and are inclined to adduce this result as an additional proof of the great importance of a well-selected cover glass, for in all subsequent counts the average of A's blood was inferior to that of B.

In the counts made by Hayem and Nachet's method, the measurements were made with the pipettes belonging to Gowers's instrument, and as these are of different dimensions from those that usually accompany the instrument of Hayem and Nachet, giving a more concentrated mixture of cells, a different calculation had of course also to be used. We follow Keyes's statement of the calculation as far as concerns the factors of the cell and eye-piece: "The glass cell on the slide is $\frac{1}{5}$ mm. deep. The eye-piece micrometer marks off $\frac{1}{5}$ mm. square; therefore the count of corpuscles must indicate the number contained (in the dilution used) in $\frac{1}{5}$ mm. cube. But $\frac{1}{5}$ mm. cube is $\frac{1}{125}$ of a c. mm.; therefore the number counted must be multiplied by 125." The blood was diluted by adding 199 parts of fluid to 1 of blood (5 c. mm. to 995

c. mm.); therefore the product above obtained must be again multiplied by 200 to get the number of cells in a c. mm. of pure blood, but instead of multiplying twice, a single multiplication of 125×200, 25,000, will give the same result. This is a much easier calculation than the one necessitated by the pipettes that ordinarily accompany the instrument of Hayem and Nachet. Our Hayem and Nachet cell was made by Mr. Zentmayer, and the eye-piece ruled by the same well-known instrument maker. The Gowers instruments were made by Mr. Hawksley, 300 Oxford St., London. The fluid used to dilute the blood was Keyes's borax solution, and was found to answer admirably.

We cannot perceive any advantage in Gowers's instrument over that of Hayem and Nachet beyond the facility it affords for reckoning percentages, and this, we think, is more than counterbalanced by the superior ease with which counts are made in the smaller squares of Hayem and Nachet. One is enabled, by the latter instrument, to count a greater number of squares with less fatigue in the same time, and the importance of counting a great number of corpuscles has been sufficiently dwelt upon. Although Dr. Gowers claims that his instrument can be used to reckon the percentage of white corpuscles as well as that of the red, our experience inclines us to agree with Dr. Jos. G. Richardson [1] that the tendency of the white cells to adhere to the inner surface of capillary tubes will "lead to incorrect estimates of the proportion" existing between them and the red.

In conclusion we would reply to a question that will arise in the minds of all readers of this paper: "Can accuracy be reached with the present blood-cell counting instruments?" Our answer is: "Yes, but through an amount of labor of which, so far, we have seen no detailed account."

A CASE OF CHRONIC CATARRHAL PNEUMONIA, WITH ANEURISM OF THE SUBCLAVIAN ARTERY, CHRONIC PARENCHYMATOUS NEPHRITIS, AND PAROXYSMAL HÆMATINURIA[2]

BY J. J. MINOT, M. D.

THE patient, who is forty-eight years old, was in years past a strong and healthy man. In 1861 he entered the army, and from this time date his various troubles. As a common soldier he was exposed to all sorts of hardships, with bad weather, bad country, and forced marches. He had a chronic diarrhœa in 1862, which lasted for three months. At the same time his urinary symptoms first made their appearance, he being unable then to retain his water for more than one half hour.

[1] New York Medical Record, March 2, 1878.

[2] Read May 16, 1877, at a clinical conference of the third class of the Harvard Medical School, the author then being a member of that class.

His legs and feet were considerably swollen, and have been so to some extent several times since. He is unable to give any account of the appearance of his urine at that time. He states that he now passes, and has ever since this trouble passed, his water rather too often, but not a great amount at any one time. In consequence, he says, of his diarrhœa he became very much debilitated, lost much flesh and strength, and was extremely pale. His voice was hoarse and weak; he was very nervous and easily excited. He was then, in 1862, discharged from the army for disability. In 1864 he again enlisted, being quite well, but not as strong as he previously was. Here also he was exposed to wet and the influences of malarial poison, many men in his regiment having chills and fever. He had then rheumatism in his various joints, and occasionally has slight attacks of it now. At about that time, after exposure to cold and wet, he had what he called "a dumb chill," which was followed at his next micturition by what he spoke of as "bloody urine," and this symptom lasted for several micturitions, and then disappeared as quickly as it came. Since then he has been subject to these attacks as follows: They come on, for the most part, with no regularity as to time, but occur after exposure to cold or wet. He first feels weak and languid, his extremities are chilly, he gapes and stretches a good deal, and soon this is followed by a chill, not quite so distinct, perhaps, as to be called a rigor. The chill lasts for a short time, and is usually *not* succeeded by a sweating stage, the feet and hands particularly remaining cold for some time after. He loses his appetite entirely, feels very weak and thirsty, and complains of pain in the back and elsewhere, with sometimes a feeling of numbness and cramps in the extremities, and occasionally some nausea. The first urine passed after a chill is described as being of the color of porter, the depth of the color varying with the severity of the chill; not much in amount, and containing a very large sediment. His urine remains of this color for several subsequent acts of micturition, which are rather frequent, when it resumes its normal appearance. His appetite and strength slowly return. He is always sleepy after one of these attacks, and if he can go to bed he goes readily to sleep, and may sometimes then have a sweating stage. After waking up he feels comparatively well. He has to wear two pairs of stockings to keep his feet warm, and the other clothes in proportion. He thinks he has been jaundiced several times, and his face now is rather sallow. The attacks occur usually soon after getting up in the morning. He has never had one in bed. Once or twice they have come on with a true intermittency for several days in succession. He is more subject to them in spring than at other times of the year, seldom having them in summer.

About 1864, and some time previous to the first of these attacks, he noticed a cough, which he has had ever since. At that time he had

two or three attacks of hæmoptysis, and has had one within a year. His cough troubles him, especially in the morning. He describes the expectoration as yellowish, rather thick, at times copious and tinged with blood. He complains of shortness of breath on much exertion, and of some pain in the chest, particularly the right side. He catches cold very easily, and may then become hoarse. There is no trouble with the eyes, except that he cannot read as readily as he used to, but this is entirely relieved by the use of glasses. He had a bubo twenty-five years ago, but no symptoms of syphilis since. There has been no return of diarrhœa since 1862. He has had nothing that could be called true and regularly intermitting chills and fever, unless possibly at those times when his attacks of dark urine came on several days in succession, with some regularity as to the hour. The patient states that he has several times been entirely "used up," being very pale and weak, though now he feels comparatively well. His appetite is good, and his digestive system in a fair condition.

Considering the symptoms in the order in which they occurred, we come first to his urinary trouble in 1862, with great frequency of micturition, œdema of the legs, and a persistency, to some extent, of these symptoms to the present time. From this we are led to suppose an acute nephritis or acute cystitis, which has now become chronic. But the examination of the urine settles it.

Next in order come the pulmonary symptoms, — cough, expectoration, hæmoptysis, etc. These would suggest phthisis as the probable, and chronic bronchitis as a possible, cause. Physical examination will show which.

Next are those attacks of dark-colored urine preceded by a chill after exposure, accompanied by certain symptoms, and disappearing after a few hours. Here we must consider the possible causes giving rise to blood or the appearance of blood in the urine. We have (1.) Traumatic injuries. (2.) Renal affections: congestion, acute nephritis, suppurative nephritis, cancer, tubercle, parasitic diseases, renal embolism, minute calculi in the tubules, hydatids. (3.) Affections of the pelvis and ureters. (4.) Affection of the bladder: congestion, acute cystitis, cancer. (5.) Gonorrhœa and urethral inflammation. (6.) Endemic disease. This occurs only in hot countries, and may be reasonably thrown out. (7.) Abnormal condition of the blood: purpura, scurvy, etc. (8.) Intermittent or paroxysmal hæmaturia, hæmatinuria, or hæmoglobinuria. The vesical and urethral causes may be dismissed, for in these the blood and urine are not intimately mixed, as they would seem to be here. In most of these the dark color of the urine is due to the presence of blood as such, while in the paroxysmal hæmatinuria, and very rarely in septic and malignant fevers, purpura, and scurvy, and after poisoning by arseniureted hydrogen or carbonic anhydride, this is not the case. Obviously, then, an examination of the urine will

enable us to decide which of these series we are to consider. We will wait, therefore, and proceed to the physical examination, and we will begin with the chest.

On inspection we find a good-sized chest, with a prominence about the sternal end of the third and fourth ribs on the left side, which he states he has always had. There is no visible pulsation in the region of the heart. But above and to the right of the supra-sternal notch a roundish pulsating body can be seen, of the size of a hen's egg. The pulsations are transmitted diagonally across the neck in the direction of the course of the transversalis colli artery, and to some extent into the carotids. The subclavian artery can be seen to pulsate in the pectoral triangle on that side. The patient stated that he had never observed this swelling before it was pointed out to him.

On palpation the apex of the heart was found to be below the normal point, but to the inside of the linea mammalis. No abnormal sensation, as a thrill, could be detected over the above swelling, or anywhere else over the chest. The impulse of the heart was rather slight. The right brachial pulse as compared with the left was weak, and the difference between the right radial and left radial was considerable, the right being the weaker. The difference between the right and left carotid and right and left temporals was slight. The impulse in the above swelling was found to be synchronous with that of the heart, and by grasping and compressing the swelling between the fingers, it could be seen and felt to expand at each systole of the heart. It was found to be quite immovable, and could not be slid about under or with the skin. On percussion dullness was found on the right side of the chest in front, from the apex to about the fourth rib. There was less dullness on the left side; it did not extend so low down. The dullness in the præcordial region was about normal. There was deficient resonance towards the top of the back and on both sides, but no circumscribed spot of dullness in the vicinity of the above-mentioned swelling. On auscultation a large number of high, fine, moist râles were heard over the region of dullness on both sides, back and front, on inspiration and cough, as well as coarse râles in the same region. No abnormal sounds were heard over the heart above this tumor in the neck, though the sounds of the heart, especially the first, were well transmitted to the ear over it. No abnormal sounds over any of the large arteries or veins were detected.

Taking, first, such of these signs as belong to the lung, — dullness, high, moist râles towards the apex, — together with the history, we reach a diagnosis of phthisis pulmonalis, chronic catarrhal pneumonia. From the rest of these signs we conclude that there is no valvular cardiac lesion that can be made out. We find, however, the apex beat somewhat lowered, which may be due to hypertrophy of the left ventricle, an explanation for which, if present, will be discovered further on.

Coming now to the tumor and the signs connected with it, we found that there was a pulsating tumor at or near the point of departure of the carotid and subclavian arteries on the right side, with the pulsations transmitted in the direction of the arteries arising near this point, with a distinct expansibility and not a mere pulsation, with a difference between the radial pulses of the two sides and some slight difference between the two carotids and their branches, but with no thrill nor murmur, the sounds of the heart, however, being distinctly heard over it. A sphygmographic tracing of the pulses of the two sides, as taken by Dr. Whittier, showed the right to be weaker than the left. These signs would immediately suggest aneurism as their most probable cause. But it must be remembered that a solid or fluctuating tumor might exist in the same situation, and give rise to many of the same physical signs. If there were any marked symptom or history connected with the tumor, it might aid us in the diagnosis. But the perfectly distinct expansibility, its immovability, the difference of the pulses of the two sides, the transmission of the cardiac sounds over it, together with the patient's previous occupation, would justify our making aneurism the diagnosis. Having settled on aneurism as the trouble, we have still to find the seat of it. From the sphygmographic tracing it is evident that the arch of the aorta cannot probably be involved, for in that case the two pulses would be more alike in intensity. It must then be in the innominate or some more distal artery. From the absence of marked symptoms connected with it, of any bulging of the ribs, and of dullness in that region, and from the carotids being but little affected, I think it can be safely said that it does not involve the innominate, at least to any extent. The actual situation of the swelling as seen by the eye is that where the subclavian and carotid leave the innominate, and it is more over the subclavian than the carotid. The signs produced by it, difference of pulse, etc., are much more marked in the branches of the subclavian than of the carotid. I would place it, then, on the subclavian, near its origin, and perhaps involving the carotid or innominate more or less.

We next turn our attention to the urinary troubles, and remembering the acute attack of some such disorder in 1862, with a persistence of the symptoms to some extent, we will examine his urine as it is under ordinary circumstances, and find the analysis to be as follows: color rather high; specific gravity 1023; reaction acid; urophæine normal; indican normal; uric acid slightly increased; urea diminished; earthy phosphates diminished; albumen one fourth per cent. The sediment, which was considerable, contained many mucous casts, fatty casts and some fat globules, finely granular and a few hyaline casts, renal and bladder epithelium, a few oxalate of lime crystals, and granular *débris*.

Here we see at once that we have some chronic disease of the kid-

ney, and the examination of the urine would point to, while the history would not disagree with, chronic parenchymatous nephritis with fatty degeneration. The increase rather than a decrease of the amount of urine passed in the twenty-four hours, the comparative absence of œdema, and the age of the patient would lead us to suspect that there was chronic interstitial nephritis. But ordinarily a pure case of either form is rare, so we may suppose some interstitial inflammation, too. But the urine, which is here the most important factor in the diagnosis, is that of chronic parenchymatous nephritis. In this we have a cause for the hypertrophy of the left ventricle as spoken of above. Whether the trouble with the eyes is a result of the nephritis can be settled only by an examination of the fundus of the eyes. Such an examination I have not made, but against such a view is the fact that this trouble is relieved by glasses; and although some authorities would ascribe both myopia and presbyopia to Bright's disease, most writers describe the ocular affection as a general increasing dimness and haziness of vision, which the use of glasses cannot correct.

We come now to the most interesting group of symptoms: the intermittent attacks of dark-colored urine, preceded by a chill, and for the most part only after exposure, accompanied by lassitude, yawning, stretching, general weakness, anorexia, pain in the back and elsewhere, sleepiness, and occasionally cramps, numbness, and nausea, with a persistence of cold extremities, rarely followed by a sweating stage, and then only after being warmly covered up, an almost complete remission in a few hours, with a return to the normal condition.

Since this man has been under my observation he has had but one of these attacks, and that was a slight one, neither the color of the urine being as dark nor the amount of sediment as great, he stated, as it usually was. I had three specimens, passed at ten A. M., two P. M., and five P. M., respectively, the chill being at nine A. M. After this the urine was normal in appearance again. The color of the first was that of rather light claret, of the second darker, and of the third considerably lighter. The specific gravity of the first was 1023, of the second 1025, of the third 1022. The amount of sediment in the first was considerable, in the second more, in the third less. The chemical examination was about the same, and as follows: urophæine and indican increased; earthy phosphates and chlorides diminished; albumen one half of one per cent.; no bile and no sugar. The sediment contained granular, hyaline, fatty, and mucous casts, renal and bladder epithelium, very few small oxalate of lime crystals, much granular *débris* of a reddish-brown color, and no blood globules.

The absence of blood as such would throw out of consideration all of the affections named above, probably, except the intermittent hæmatinuria, and those cases in which this symptom occurs in septic and

malignant fevers, purpura, scurvy, poisoning by arseniureted hydrogen and carbonic anhydride. With the description of the cases I have been able to find of intermittent hæmatinuria, the history and the examination of the urine of the patient agree in all the important particulars. In all of these cases the attacks came on after exposure to cold or wet. In most the subsequent attacks occurred only after a fresh exposure. The rational symptoms attending these, as described, are those in this case. As I have never had an opportunity of seeing this man during one of his attacks, I cannot say what there is to be found on physical examination, but in the cases mentioned it is as follows: the temperature falls below normal; the pulse is slow, the body cold, the skin sometimes jaundiced, the spleen occasionally enlarged. The temperature and pulse slowly rise to their normal points, rarely going above them, and remain there until the next attack. But after all, the hæmatinuria can be considered only as a symptom, and not as a disease. The true trouble, then, is yet to be sought, and here pathologists are very much divided, nearly every one who has reported cases having a view of his own. In the first place, it might be considered as due to progressive pernicious anæmia. It will be remembered that in a case read here last fall by Mr. Bancroft there were many symptoms similar to those here described, and that then the diagnosis reached was progressive pernicious anæmia. In that case, according to the analysis of the urine, there were but few blood corpuscles detected, and those only once. Many of the symptoms were similar to those here, — the paroxysmal character of the dark urine and the general feeling of weakness, etc. There were not, I think, well-marked chills. It is known that hæmorrhages do occur in progressive pernicious anæmia. But whether they may occur, as here, without the appearance of the blood globules, as such, I have been unable to find out. However, an examination of the blood in this case, as made by Dr. E. G. Cutler, showed that there was but the slightest degree of anæmia present, with no alteration either in size or appearance of the blood globules, and no protoplasmic corpuscles present. Progressive pernicious anæmia, then, may be dismissed as a cause in this case. In that case, as in ours, there was nephritis besides the anæmia. The question arises, Could nephritis give rise to the solution of the blood globules and the setting free of its coloring matter? The experiments of Magendie show that water injected into the blood does cause a dissolution of the corpuscles. But Professor Lebert states that he has never seen this occur with any dropsical or hydræmic condition in man. Again, Naunyn [1] has shown that if a large amount of blood pigment is at once set free, part of it may pass out unchanged through the kidneys. Von Dusch has stated that the effect of biliary acid in large amounts on the blood consists in the dissolution of the

[1] Archiv für Anat., etc., 1868, 4 Heft.

blood corpuscles, and, further, that the action of the biliary acids on the muscular and nervous systems produces a slow pulse, a low temperature, reduced respiration, languor, debility, and easy fatigue, and in severer cases stupor, coma, etc.

These facts, together with the occasional presence of jaundice during the paroxysms of hæmatinuria, have led to the belief that there was some trouble with the liver, but none such has been found on post-mortem examination.

In some of the cases reported by Dr. Begbie, W. Roberts, Druitt, and others, the patients had had chills and fever, while others had been exposed to malarial poison, but in still others no such exposure could be found. On this ground, and on account of the periodicity of the attacks and their having yielded to quinia, the theory was propounded that this was but one of the many manifestations of malarial poison. This would seem to be the opinion of many, and especially, perhaps, of the earlier reporters. Dr. Brunton, in the summary of a case reported to the Royal Medical and Chirurgical Society, states that Lussana has shown the seat of malarial poison to be in the portal circulation; that whenever it escapes into the general circulation an ague fit occurs; and that the phenomena of ague are due to a contraction of the cutaneous blood-vessels, with a congestion of the internal organs, and so the renal vessels being supposed to offer the least resistance the blood escapes there. But these attacks are not directly periodic, but require a fresh exposure each time, and the temperature is below, not above, the normal point. The malarial origin is denied by many, among whom are Greenhow,[1] Begbie,[2] Pavy,[3] Murchison, and Thudichum.[4] Greenhow thinks it is due to some dyscrasia on which the blood acts as the immediate exciting cause; he places much force on the presence of oxalate of lime crystals in the urine, which he found to be constant in his cases, though others have failed to find them and state that they are of no consequence. All of his patients had had rheumatism, and this is thought to have had something to do with it. Dr. Begbie, though he admits the possibility of a malarial poison, states that the kidneys must be interfered with before so much stuff can pass away through them. He says that the idea that the coloring matter of the blood is changed into the pigment of urine in the kidneys is quite untenable, and moreover there is often jaundice present in these cases, which can be easily explained, if we are seeking for the causation of the disease in the breaking down of the blood corpuscles, whether in the liver or elsewhere. Although the conditions necessary for such a change to take place are not certain, however produced, the broken-down corpuscles may be

[1] Edinburgh Medical Journal, 1868.
[2] Medical Times and Gazette, 1875.
[3] British Medical Journal, 1871.
[4] Reporting officer of the Privy Council.

driven round the body, and so jaundice may occur, and the passage of blood pigment by the kidneys follow. Certain forms of jaundice would seem to show that mental or nervous influences can effect such a change, and this same theory will extend to the origin of paroxysmal hæmatinuria. Bristowe states that there is no structural lesion of the kidney. The phenomena, he says, are due probably to an influence transmitted from the skin to the vaso-motor nerves of the kidney, and thus the small vessels are stimulated to a temporary condition of active dilatation. Finally, Druitt [1] sums up his case as follows: Is it a neurosis? a disturbance of the blood vessels caused by a worn-out nervous system? or is it hæmolysis, a decomposition or necrosis of the blood corpuscles? He thinks both, though he cannot assign the proper value to each. That the brain is involved he thinks is clear, from the fact that over-exertion of the brain and nervous system can bring on an attack. It is equally undeniable, he says, that unnatural changes are going on in the blood, of which a dusky complexion is an early sign that the blood corpuscles are unstable and breaking down into bile and lithates (the latter being found in some cases), whence the occasional jaundice and urinary deposit; also, that probably, at other times, the quantity of blood globules destroyed is too great to be oxidized into bile and urine stuff, so that then they are excreted bodily by the kidneys. But how they escape he cannot explain; probably the nerves and altered blood both concur in effecting a sudden stagnation of the circulation, paralysis of the capillaries, and disintegration of the blood corpuscles. The effects of quinia and the periodicity may, he thinks, be considered an evidence of a malarial character.

So we see that the true nature of the disease, of which the apparent affection is a symptom, is still undecided, and consequently, in default of a better name, the disease goes by the name of its symptom, paroxysmal hæmoglobinuria.

We have arrived, then, at a diagnosis of the troubles which our patient has: chronic catarrhal pneumonia, aneurism of the subclavian artery, chronic parenchymatous nephritis and paroxysmal hæmoglobinuria.

Prognosis. — For the phthisis the usual unfavorable one is to be given. That of the aneurism is probably unfavorable, most cases of thoracic aneurism ending fatally sooner or later. The usual eventually unfavorable prognosis is to be given for the nephritis, and for the hæmoglobinuria the prognosis as regards life is favorable, but for a permanent cure probably it is not so.

Treatment. For the phthisis the ordinary measures for relief from this disease are to be used. For the aneurism the treatment is various, the object being to obtain an obliteration of the sac either by slowing

[1] Medical Times and Gazette, 1875.

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the blood current, by producing irregularities of the inner surface, and so coagulating by causing inflammation and obliteration of the sac, or by completely shutting off the blood from the aneurism either permanently or temporarily. With these ideas in view many things have been tried: First, tying the artery on the proximal side of the aneurism (this of course cannot be done here). Second, tying the artery or its branches on the distal side; here by tying the carotid and subclavian simultaneously. Third, by digital pressure, kept up for a long enough time to secure coagulation of the blood in the sac. Fourth, by trying to cause a contraction of the walls of the sac by injecting ergot, etc. Fifth, by causing coagulation by chemical means, as the injection of the salts of iron, etc. Sixth, by passing a galvanic current through the aneurism. Seventh, by the internal administration of drugs, as the iodide of potassium. And, finally, the cure may be spontaneous. Most of these methods have not given very encouraging results, except perhaps the tying of the artery.

For the nephritis, the health and strength should be kept up, exposure avoided, and the symptoms treated as they arise.

For the paroxysmal hæmoglobinuria, the great thing is prophylaxis by warmth, exercise, warm baths, mustard baths, warm clothes, a warm and unchangeable climate, the avoidance of cold and wet, and particularly of draught. As for drugs, quinia in large doses is the only one that seems to have had any real effect, though nearly everything has been tried. Iron may be necessary for the anæmia, and in general the strength and good condition of the body are to be improved by every means.

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RECENT PROGRESS IN URINARY SURGERY.

BY T. B. CURTIS, M. D.

Rapid Lithotrity. — Our readers are familiar with the new operation for stone in the bladder, devised by Prof. H. J. Bigelow, and described a year ago in this journal.[1] When the attention of the profession was first called to this procedure the cases adduced in its favor, though showing brilliant results, were too few in number to be conclusively demon-

[1] See the JOURNAL, February 28 and March 7, 1878; also May 2, 1878.

strative of its value. Since that time several surgeons have practiced Dr. Bigelow's operation, and both the results obtained and the opinions expressed by them appear very favorable to the new method.

One of the first to record his experience was Professor Van Buren,[1] of New York, who, on the strength of six successful cases, speaks as follows: "Personally I feel much confidence that Professor Bigelow's novel proposition that lithotrity may be safely accomplished in one sitting will be successfully demonstrated, and that his discovery of the hitherto unrecognized tolerance of the bladder — for it is certainly to be regarded as a discovery in the full sense of the term — will by its great practical value modify the future of lithotrity."

Dr. H. B. Sands,[2] of New York, has published a successful case, in which an operation lasting one hour and ten minutes, practiced upon a patient sixty-nine years of age, was followed by no bad symptoms, and resulted in recovery.

Dr. E. L. Keyes[3] recently exhibited to the New York Pathological Society four calculi which he had crushed and removed in one operation by Dr. Bigelow's method, bringing the number of cases so treated by him up to thirteen. The first of the four stones weighed two drachms, and was removed in forty-five minutes. The second weighed six drachms, and was removed in an hour and two minutes; at the end of one week the patient went out to walk. In the third case the stone weighed six drachms; the operation lasted thirty-five minutes. In the fourth case the size of the stone was not stated; the operation lasted thirty minutes. In the course of his remarks upon these cases, Dr. Keyes said that "he had now performed thirteen operations by Bigelow's method, and it seemed to him that each additional operation, each increase of experience in its performance, was an argument in favor of the method. He had not had a fatal case, and believed that Bigelow's method would be the one which would supersede all others for the removal of vesical calculi."

Sir Henry Thompson, who is universally recognized as the leading authority on the subject of lithotrity, has long been the advocate of a method which is the opposite of that now proposed. He has hitherto practiced and advised multiple sittings of very short duration. In the last edition of his clinical lectures[4] he spoke as follows: "The mere sojourn of the instrument in the bladder is a source of irritation precisely corresponding to the time, within certain limits, it continues there." He adds: "It has therefore been an object with me to lessen as much as possible the number of instruments employed, the amount of manipulation applied to them, and the time devoted to this process." An ed-

[1] New York Medical Record, September 28, 1878, page 241.
[2] New York Medical Record, January 25, 1879.
[3] New York Medical Record, March 15, 1879.
[4] Lectures on Diseases of the Urinary Organs, London, 1876, pages 172, 174.

itorial article in the *Lancet*,[1] contrasting his method with that of Dr. Bigelow, says: "Lithotrity as hitherto practiced by him and lithotrity as recommended and performed by Professor Bigelow are different operations, and based on opposite and contradictory principles."

Quite recently, however, he has published a lecture on Lithotrity at one or more Sittings, in which the opinions and practice recorded are such as, in the words of the editor of the *Lancet*, "involve the abandonment of his old position." He therein shows himself to be favorably inclined, within certain limits, towards the new method, and records a case in which gratifying results were obtained by means of lithotrity and evacuation combined, and terminated in a single operation. He cannot, however, as yet be said to have fully tested the capabilities of the new method; for, although he, in common with all lithotritists, has often accomplished the removal of small stones in one operation, with or without the assistance of an evacuating apparatus, he has recorded but one case where the size of the stone broken and removed in a single sitting was sufficient to entitle the operation to be classed with those of Dr. Bigelow. In this very recent case the stone weighed two drachms, and was therefore large enough to have required several sittings by the old method, though far below the size of some of the stones successfully removed in one sitting by other operators.

This stone, weighing two drachms, was removed in eight minutes, and inasmuch as the evacuating apparatus used was defective in some of the particulars considered most important by Dr. Bigelow, the rapidity with which the stone was removed testifies to the exceptional skill of the operator. It has, however, been noticed in this country that a considerable part of the time occupied by the operation is consumed in verifying its completion. Experience has shown repeatedly that although as much as two drachms of calculus may easily be evacuated in as short a time as eight minutes, somewhat more time is required to allow the operator to make sure that he has fully accomplished his undertaking, and to ascertain that no fragment remains in the bladder to act as an irritant, or to form a nucleus for further deposit.

Instead of trying the perfected apparatus devised by Dr. Bigelow, Sir Henry Thompson has preferred to use Clover's original instrument, slightly modified, as he says, by himself, with evacuating catheters not exceeding 26 French in calibre, — larger than these being "mostly dangerous and wholly unnecessary." Not only is his catheter smaller than that advocated by Dr. Bigelow, but the eye of his instrument, as figured by him, has a calibre considerably smaller than the already inadequate calibre of the catheter itself. The efficiency of the evacuating tube is thus very much diminished. The stone to be dealt with in his case being rather small, the disadvantages of the evacuating apparatus could

[1] The Lancet, February 1, 1879, page 145.

hardly make themselves felt. It is to be hoped that Sir Henry Thompson, having taken this first successful step in the direction of litholapaxy, will consent to modify still further the operation and the apparatus to which he has been accustomed, and that he will be induced to try rapid lithotrity with a still larger evacuating tube on a still larger stone.

The foregoing citations show that the new operation devised in this city is rapidly making its way into general acceptance as a safe and speedy cure for a painful and dangerous disorder, and that an amount of experience is now on record which shows that the claims originally put forward in behalf of its security and efficiency were not excessive.

Phymosis as a Cause of Rupture in Children.[1] — To phymosis, which occurs so frequently in children and is so often apparently harmless, numerous ill effects have been attributed. Incontinence of urine, fits and various spasmodic affections, masturbation resulting from the irritation caused by retained smegma, balanitis, and, later in life, epithelioma of the penis, have been said to be occasional results of this condition. Professor Sayre has called attention to phymosis as being a cause of paralytic affections of the lower limbs. The first person to observe a connection between phymosis and the occurrence of hernia seems to have been Mr. Owen, who is quoted by Mr. Kempe as saying that "in cases of umbilical and inguinal hernia it is well to look to the size of the urethral and preputial orifices." Mr. Kempe, having noticed the frequent coincidence of phymosis and hernia, was thereby induced to make investigations in the cases occurring in the Children's Hospital, of which he is surgeon. He therefore took fifty cases of phymosis, unselected, and found that in thirty-one there was rupture. In five cases there was double inguinal hernia, and in many umbilical hernia existed in addition, this form not being counted when occurring alone. In no case was the rupture noticed at birth; the earliest was discovered at the age of three weeks, the latest at two years and a half. In all these cases circumcision was performed. In five cases the hernia disappeared entirely, and in all much improvement resulted. "It cannot be unreasonable," says Mr. Kempe, "in the face of these facts, to suppose that a long and tight prepuce may be a cause of rupture in children. The sequel of events is probably as follows: the abdominal parietes are naturally weak in children, which renders them less able to resist impulses which project the viscera against weakened parts. Here, then, is a remote or predisposing cause. The exciting cause is, I think, readily supplied by the frequent and continued efforts that the child makes to overcome the obstruction offered by the tight prepuce, and by the cries uttered consequent on pain caused in making these efforts."

Solution of Quinine as an Injection in Chronic Cystitis. — In a pre-

[1] J. A. Kempe, The Lancet, July 27, 1878, page 119.

vious report[1] the use of bactericidal solutions for washing out the bladder in cystitis was spoken of. To the agents then advocated (salicylic acid, borax) quinine must be added as deserving a trial, on the strength of the results obtained from its use by Mr. Nunn in cases of chronic cystitis with decomposition of the urine within the bladder. The following is the method of preparing and of using the solution: "Dissolve twenty grains of disulphate of quinine in twenty-five ounces of water by the aid of a few drops of dilute sulphuric acid or a teaspoonful of common brown vinegar. Of this solution inject into the bladder two or three ounces, and let it remain."

Treatment of Incontinence of Urine in Children.[2] — In this troublesome and often refractory affection there is a very simple means of prevention which occasionally proves successful, and seems therefore worthy of trial It consists in modifying the diet of the child by diminishing the amount of meat, or by suppressing the use of meat altogether, for a while. The efficacy of this means in obstinate cases is testified to by two observers.

PROCEEDINGS OF THE BOSTON SOCIETY FOR MEDICAL IMPROVEMENT.

E. G. CUTLER, M. D., SECRETARY.

JULY 22, 1878. *Apparatus for Prolapsus of the Rectum.* — DR. C. P. PUTNAM showed a boy who had been troubled with prolapsus of the rectum for three years. He was eight years old, and had but recently come under treatment. The prolapsus occurred only during defæcation, and as it seemed probable that the ordinary position assumed during this act might aid in the production of the difficulty, the patient was required to sit on a chair with the feet hanging free at the time of stool. This and other means were tried without avail. Finally a strip of tin was devised to go around the waist, bearing an arm which curved around the sacrum and terminated at the anus in a ring of a size sufficient to allow of free discharge of fæces, and yet which kept up the gut when the tapes attached to the ends of the apparatus were tied tightly. The apparatus had been worn for some time at every defæcation, and had been effectual in keeping the intestine in place.

Rupture of the Bladder. — DR. C. D. HOMANS reported the case. A man twenty-two years of age, a laborer, was brought into the hospital July 7th partially unconscious. There were bruises on the head, but none on the abdomen. It was learned that twelve hours before he had been pounded by another man who had fallen on him while both were intoxicated, and that he had not passed his water for many hours. Complaint was made of pain over the region of the bladder. A catheter was passed, and a little turbid urine drawn. At night again a small quantity was withdrawn, and morphia was

[1] See the JOURNAL, November 29, 1877, page 620.

[2] J. M'Intyre, The Lancet, May 4, 1878, page 665. F. N. Greenwood, ibid., May 25, 1878, page 778.

ordered as occasion required. July 8th sixty ounces of urine were drawn at one time, containing pus and blood. There was pain over the region of the bladder, with tenderness, and symptoms of general peritonitis appeared. July 9th the ordinary amount of urine was drawn off, and it was found to contain blood and pus still. July 10th the patient had to be catheterized, though he passed a little urine himself. He continued to become worse, and finally died at one o'clock that night.

Dr. Draper, who had made the autopsy, showed the specimen. The peritonæum was covered with false membrane. On the fundus of the bladder externally there was a rent half an inch long extending through the serous and muscular coats. On the inside of the bladder the rent was two inches long, and of a crescentic shape. In the fresh state the muscular coat was covered by a white substance which was apparently a slough. The mucous membrane of the bladder was everywhere injected.

Excision of the Hip. — Dr. Bradford showed a specimen taken from a patient on whom excision of the hip-joint had been performed a year before by Dr. Langmaid, at the Children's Hospital, for extensive disease. At the time of the operation there was albumen in the urine. The patient died a year after the excision with symptoms of uræmic poisoning. In spite of the unfavorable condition of the patient, the specimen showed the establishment of a new joint at the place of previous excision. The acetabulum had been absorbed; the shaft lay on the dorsum of the ileum, just above the acetabulum, the ileum and shaft were united by a well-formed capsule which was perforated by ulceration, the cavity of the new joint containing pus. The ileum and femur were both extensively affected by inflammation, and were thin and friable. The ileum at places was so soft that a knife could be passed through. In places there was an attempt at the formation of new bone. The kidneys showed amyloid degeneration of the Malpighian bodies and the vessels leading to them.

Myoma of the Stomach. — Dr. Cutler showed the stomach of a patient who had died of heart disease. At the pyloric end of the organ there was a dense polypus the size of a large bean projecting from the anterior wall by a slender pedicle. The terminal end of the polypus rested just within the pyloric orifice. There had been no gastric symptoms during life. A microscopic examination showed the tumor to be composed of unstriped muscular fibre, and a little connective tissue covered by a mucous membrane.

Mucous Polypus of the Colon; Diverticulum of the Ileum. — Dr. Cutler also showed a portion of the ascending colon of a child, from the mucous membrane of which hung a mucous polypus the size of a small cherry. The child was four years old, and had suffered from a severe attack of diarrhœa in infancy. In the same subject a diverticulum from the ileum was discovered about two feet above the cæcum; it was the size of a robin's egg, and did not communicate with the gut. A microscopic examination of the fluid it contained revealed granular cells, granular fat, cholesterine plates, and some fatty, degenerated, round epithelium cells.

Epilepsy due to Phymosis and to Irritation from a Tooth. — Dr. Webber reported two cases of epilepsy: (1.) In a boy aged ten there was no known

cause except phymosis. The child would scream in his sleep, and have slight spasmodic paroxysms; as many as four or five attacks occurred daily. Bromide of potassium had been given without effect. He was circumcised at the City Hospital, and the attacks afterwards increased in number to sixteen in the day. Bromide of potassium was pushed to ninety grains in twenty-four hours without affording relief. The wound at this time had not healed; after cicatrization was complete the epilepsy ceased, and had not returned in the past six months. (2.) A girl aged thirteen had two or three severe epileptic attacks, with loss of consciousness and spasm. Subsequently she had four or five slight paroxysms daily, with loss of consciousness and faintness. She was found to be cutting the last molar tooth on the right side. A dentist was consulted, who applied caustic to the tissue over the tooth, and gave her gum to chew. The tooth came through, and the attacks ceased. The patient had taken bromide of potassium with atropia; the paroxysms were stopped more by putting an end to the irritation than by the exhibition of medicine. She has remained well for a month.

Latent Pneumonia. — Dr. Stedman related the following case: He had seen, on the evening of the 8th of June, a merchant, aged twenty-eight, of dark complexion, tall and slim, but athletic, who had always had good health. There had been no pulmonary disease in his family, though cardiac disease had been known. The patient was said to have been well till the 6th or 7th, but it was learned that two weeks before he left his yacht at City Point, and ran the length of South Boston to catch a train. His exhaustion after this feat excited remark. On the 4th he drove in an open wagon, insufficiently clad, and was chilled. Dr. Stedman found the pulse 80, the temperature 103.5°, and the respiration 24. The patient complained of violent headache and pains in the back and limbs, which disappeared, however, in three days. A slight cough with no expectoration drew attention to the chest, and the chances of pleurisy or acute tuberculosis were considered; no abnormal physical signs were detected; there was no flush, and dyspnœa was not marked. He had been exposed to measles, and it was uncertain whether he had them in childhood. In a few days there was mild, muttering delirium, with retention and dysuria, requiring the use of the catheter once during the first week. Pressed for a diagnosis, Dr. Stedman called the disease typhoid fever, having another young business man with mild and marked typhoid under treatment not far from this patient. The temperature declined steadily, with morning remissions, till the eighth day of the disease, when it became normal for the remainder of the illness. On the eighth day the daily auscultation of the lungs had been omitted. On the ninth day there were coarse liquid râles with tubular respiration over the lower lobe of the left lung; copious mucopurulent expectoration (never rusty) had begun; great prostration, emaciation, and hacking cough followed in severe paroxysms, and the patient's condition became critical, the above-named physical signs pervading both backs, though never heard in front. There was a bruit of uncertain nature with the first sound of the heart at the apex.

On the 3d of July Dr. Knight saw the patient in consultation; that evening the temperature was 101° for the only time since the eighth day. His condition was called catarrhal pneumonia, and an unfavorable issue was feared.

Dr. Stedman determined on treatment by alcohol, and the patient's stimulus was increased to the full amount he could bear without being tipsy, which proved to be a pint of champagne daily and a bottle of rum a week. In four or five days cough and expectoration lessened, and the lungs began to clear; in a week amendment was marked; in a fortnight he left his room; and in the last days of July he had a drive. On the 1st of August he went to the sea-shore, with no abnormal sounds in the lungs. There remained a souffle at the apex, heard in the base also, with the first sound of the heart. Dr. Stedman asked if his early diagnosis was correct, and if not, what other could have been made before the eighth day.

Dr. Jackson was inclined to regard the case as one of lung disease, in which the cerebral symptoms masked the pulmonary ones.

Dr. Williams, in commenting on the case, considered it one of pneumonia, and instanced Chomel's lecture on latent pneumonia, which he had heard. Sometimes the symptoms in the lung did not come on till quite late.

September 9 and 23, 1878. *Ovariotomy.* — Dr. J. Homans related two successful cases of ovariotomy, and showed the specimens. The cases have been published in the Journal.

Cancer of the Œsophagus with Complications. — Dr. Draper reported the case. A sailor, fifty-two years old, had always been healthy till the middle of last May. His first symptom was hiccough, which annoyed him constantly till the middle of July, when dysphagia supervened. He was then obliged to forego solid food, on account of the difficulty of swallowing and coughing which it caused. At his entrance to the City Hospital, the 10th of August, complaint was made of pain in the interscapular region and in the front of the thorax. The appetite was good; the tongue was covered with a thin, moist, light-colored coat. The pulse was 132, weak and regular, stronger in the right radial than in the left, and dysphagia was well marked. Solid food could not be borne, and all attempts at swallowing liquids were conducted with great caution and anxiety by the patient, to avoid violent cough and dyspnœa with regurgitation. The facial aspect showed mental depression and solicitude, but the skin was natural in appearance. Physical examination of the chest failed to discover any unequivocal signs of disease in the heart and lungs. The apex beat of the heart and maximum intensity of the first sound were observed to be displaced downward and to the right, but there was no indication of an organic lesion in the heart or its vessels except the violent action and difference in the radial pulse. There were no abdominal symptoms.

During the month following the patient's admission to the hospital he improved considerably in condition. The diet was carefully regulated to suit his wants, and he took sufficient milk to satisfy hunger. There was, however, a slight loss in weight. The stomach was quiet, and the bowels acted normally. The heart's action improved, the pulse falling from 130 to 60. Sleep was more quiet with the aid of cough mixtures. The patient went about the ward, complained less of pain in the chest, difficulty of swallowing, and cough, and appeared more hopeful; he was able frequently take liquid food without mishap if he swallowed slowly, but any unguarded attempt at deglutition was attended with risk of spasm of the œsophagus, with attendant cough. One

week before his death the patient was suddenly seized with sharp pain in the right side, below the nipple. Dyspnœa and lividity with irregular action of the heart accompanied this pain; the pulse was 120, the respirations 44. The next day the temperature, previously normal, was 101.4°. The expectoration was scanty, thick, light yellow. There was dullness on percussion in the right lower lobe, with great tenderness. Auscultation gave bronchial and broncho-vesicular breathing in the same region with the dullness; there were no râles.

The third day the symptoms and signs were those of pneumonia. The pulse was 144; the respirations were 40. Opiates were continued, and stimulants were added. The fourth day there was slight improvement, with less fever and distress. During the interval since his sudden seizure the patient had resisted persuasion to take solid food, but now manifested a readiness to resume his milk with the addition of brandy. The improvement in the rational and physical signs remained, and in some respects progressed during the two days following, but there were repeated and prolonged attacks of coughing. The heart was acting better than for many weeks, and the stimulants were reduced from six to four ounces of brandy daily. In the morning of the seventh day, after a comfortable night, it was noticed that the respirations were more hurried, and that the sputa were of a dirty dark-brown color, very thin in consistence, of a scarcely perceptible acid odor, and considerable in amount. Auscultation showed gurgling and cavernous respiration throughout the lower half of the right chest in front, with tympanitic resonance on percussion. At the left base in the axillary line fine crepitant râles were heard over a space as large as a silver dollar. The respirations were 44, and the prostration was extreme. The skin was cyanosed over the forehead and cheeks. The next day, in addition to the above physical signs, there were superadded in both lungs abundant sonorous, sibilant, and fine mucous râles. A severe paroxysm of pain in the chest in the afternoon was relieved by morphia subcutaneously; in a recurrence of the paroxysm a few hours later the patient died. At the autopsy the peritoneal sac was distended with gas and the peritonæum highly injected, while a perforation had taken place through the anterior wall of the duodenum. There was found to be a cancerous new growth in the œsophagus, commencing just above the bifurcation of the trachea, and extending two and a half to three inches downwards. A quite extensive ulceration had occurred, with perforation of the œsophagus, into one of the posterior branches of the right primary bronchus. The œsophagus, just above the cardiac orifice of the stomach, was the seat of a round, perforating ulcer an inch and a quarter in diameter. A duodenal ulcer was found, irregularly figure-of-eight shaped, extending through the muscular coat, situated chiefly on the posterior wall, and commencing just without the pyloric orifice. It extended two inches down the gut, and perforation had occurred in the upper portion. There was a large cavity in the lower lobe of the right lung, with shreddy, necrosed walls, and filled with a sour-smelling, dark, brownish-green fluid. Perhaps two thirds of the lobe were included in this disorganized portion of lung, and the pleura over it was reddened, injected, dull, and covered with false membrane.

Head of the Tibia removed subperiosteally for Caries. — The case was reported by Dr. Bradford, and has appeared in full in the Journal.

Plugging of certain of the Cerebral Vessels. — Dr. Edes reported the case.

A woman sixty years old, married, in rather destitute circumstances, entered the City Hospital May 30th. She kept having semi-convulsive or spasmodic attacks, chiefly of the upper part of the body, accompanied by outcries of pain or fear. She called them chills. There was a systolic murmur of the heart at the second intercostal space on the right. She had so-called rheumatism in the previous November and December, accompanied and followed by some numbness in the left hand and by severe pain in the left ear. She had also had, beginning December 11th, what was considered by her physician a syphilitic roseola, and admitted the possibility of infection. She improved under mercury and iodide of potassium. The patient is said to have had a fit on May 10th, with general convulsions, after which the left hand was numb. The symptoms improved under good diet and tonics, with some bromide and chloral, but about June 20th there was an increase of her nervousness. There was delirium, a good deal of unintelligible muttering, but also certain well-marked delusions as to being abused, and especially with reference to her husband. Her mind seemed to run on sexual matters. At this time a well-marked hemiplegia made its appearance. It lasted for a number of days, and began gradually to diminish, until on August 6th, a few days before her discharge, it had left only slight traces, and her mind had become much clearer.

Neither ophthalmoscope nor otoscope disclosed anything abnormal. After leaving the hospital she remained well three weeks. On September 1st violent pain on the right side of the head occurred, followed by paralysis beginning on the right side of the face and left arm, and gradually involving the left leg. Speech became indistinct the 11th and 12th, and on the 15th death took place.

At the autopsy the body was found well nourished. The calvaria was thick and dense. The pia mater at the vertex was distended with serum, and the brain generally was rather full of blood. The arteries at the base of the brain were thickened in various places and filled with dense plugs. This was the case on both sides at the origin of the anterior and middle cerebral arteries, and at the remoter points of division of the latter. The basilar artery was also plugged. A small spot of softening was found, too, at the point of the right temporal lobe. (A.)

At about the middle of the nucleus lenticularis on the right side there was a small cyst 1.5 centimetres long, with tolerably defined walls, and containing a few drops of turbid fluid. The long axis of the cyst was up and down. (B.)

On the upper surface of the left lobe of the cerebellum there was a considerable space of yellow softening. (C.)

In the posterior third of the pons, near the lower surface and close to the median line, there was a small, ill-defined spot of softening as large as a pea. (D.)

Throughout the left side of the lower part of the parietal and frontal lobes the cortical substance had, on section, a more yellowish hue than elsewhere or than normal. (E.)

There was no valvular disease of the heart, but the walls were quite soft. The liver contained a small cyst on its upper surface, and a portion of the capsule near the gall-bladder was thickened. The kidneys were rather soft and cloudy. The spleen was not enlarged.

On microscopic examination B, C, and D were found to contain numerous granulation corpuscles and more or less of normal elements (D least). No crystals or granules of hæmatoidine were found, and only a few masses of light yellow pigment. E. The general substance was more granular than normal, The larger nerve-cells were very decidedly fatty. The kidneys were granular and fatty.

At the points of apparent thickening of the arteries were dense fibrinous plugs more or less adherent to the walls of the vessels. In the anterior vessels (carotids, anterior and middle cerebral) these were white; in the basilar, one at the bifurcation was red and dense, one posterior to this, loosely adherent, was less dense and dark colored. Examination by the microscope showed no thickening of the intima; the outer part of the arterial wall contained or was composed of numerous small cells. The plugs, which were closely adherent to the walls, the intima forming a nearly white line between the portions stained with carmine, were also largely composed of small cells (leucocytes?).

THE CONNECTICUT BOARD OF HEALTH.

The act establishing a State Board of Health in Connecticut provides that at least three of the six members appointed by the governor shall be physicians and one a lawyer; two retire from office biennially, or are reappointed. Dr. Chamberlain, of Hartford, has been elected permanent secretary, and thereby has become the seventh member of the board, the other physicians being Dr. J. S. Butler, president, Dr. Hubbard, of Bridgeport, and Dr. Lindsley, the well-known health officer of New Haven, to whom we are glad to add the name of Professor Brewer. The board have advisory duties, are required to make investigations as to causes, prevalence, prevention of disease, etc., distribute information, coöperate with local boards for suppressing epidemics, supervise registration of vital statistics, and may employ experts or agents to make inquiries.

From their first report one may readily see that they have entered upon their responsible work with broad and intelligent views, and that they are advancing "in that higher line of political economy which is sure to lead a State to increased power and wealth." The facts and suggestions with regard to state medicine, infectious diseases, registration of vital statistics, and pollution of streams are full of interest and value. Diphtheria has been prevalent during the past year, associated, for the most part, with bad drainage. A marked increase in the prevalence of malarial fever is noted, and is a subject which we hope the board will further investigate. Typho-malarial fever appeared for the first time in the published mortality lists in 1877, and there were quite frequent cases in 1878, although no epidemic occurred except in and near Hampden, where (including Derby) there were twenty-one deaths from it. In Hartford, New Haven, and Salisbury it was reported of decidedly increased prevalence and extending over a wider area. In Durham ten cases were attributed to recent drying of a fifty-acre bush-swamp. Malarial fevers of local origin were reported, during the year, for the first time in several towns. An extensive epidemic of typhoid fever was traced to the use of polluted drinking-water taken temporarily from the river.

RECURRENCE OF YELLOW FEVER ON BOARD A REFRIGERATED SHIP.

THE United States steamship Plymouth, Captain Harmony, which left Boston March 15th for a cruise to the West Indies, has returned to Vineyard Sound on account of two cases of yellow fever occurring on board when about three hundred miles southeast of the Bermuda Islands. The ship had been in Boston during the winter, and as she had come from the West Indies last autumn with yellow fever on board, she had been frozen out and fumigated. As the ship had not called in any port since leaving Boston, this development showed that the germs of yellow fever still existed in her.

This occurrence as recorded in the daily press is interesting and important in connection with a recurrence of yellow fever at New Orleans during the approaching summer, a possibility which is anticipated with considerable anxiety by inhabitants of less exposed parts of the country, at least, if not by those of New Orleans itself. That city apparently is contented with congratulating itself upon the unusual severity of the past winter and appointing a sanitary committee or two. As far as we know, nothing has been done to correct the sadly filthy state in which the outbreak found the city last year; and if this filthiness is no greater now than then it has at any rate been testified to by a greater number of witnesses. This survival of the poison of yellow fever on board the Plymouth, if authenticated, has also an important bearing upon the proposal to attach refrigerating ships to quarantine stations. This was a scheme in which the late Dr. Woodworth was interested; and an appropriation of $200,000 has lately passed one branch of Congress for the construction of such a ship. We do not know the result of the experiments undertaken to test the value of this system for making infected vessels harmless. It is, however, stated that the Plymouth was thoroughly fumigated and refrigerated. The fumigation may perhaps have been thorough, but there can hardly be any doubt as to the thoroughness of the refrigeration if she lay at Charlestown with open hatches for any length of time this past winter.

MEDICAL NOTES.

— The Paris correspondent of the *British Medical Journal* announces the appearance in French of Annie Besant's notorious and extraordinary pamphlet on the means of preventing conception. But pachydermatous as the French are commonly supposed to be in regard to literature of "Frenchy" character, the Besant production has so shocked them that a petition for the suppression of the pamphlet has been presented to the director of the press, the work being considered unscientific as well as filthy. The correspondent, moreover, says that the introduction of the book into France at this time is a misfortune, because of a steady decrease in the population, which has so alarmed the nation that popular works are published on all sides to teach better management of infants, and check the excessive infant mortality which now prevails in France.

NEW YORK.

— The committee on tenement-house reform, appointed at the mass meeting held in the Cooper Institute, on the 28th of February, have made a preliminary report, in the course of which they state that, although they believe that much may be accomplished by legislation and by the establishment of limited-liability building companies, there still remains a necessity for a permanent fund, of which both the principal and interest shall be exclusively devoted to the building of model lodging-houses for the laboring classes. This is the plan of the Peabody fund in London, and the committee think that it is not improbable that a number of citizens can be found to do for New York what George Peabody did for London. It is therefore proposed that a fund of one million dollars be formed by subscriptions of five thousand dollars, but that no subscription is to be payable until two hundred and fifty thousand dollars have been subscribed. After giving the details of the contemplated scheme, the report recommends the passage by the legislature of a bill covering what the committee think the necessary points of reform, which aims at more light, more ventilation, more space for each lot, and more definite provision against overcrowding, and includes a system of sanitary police and licensing of all tenement houses by the board of health.

The report also contains an allusion to the present filthy condition of many of the streets (a matter that is exciting a good deal of public attention and indignation), which is not only a source of discomfort and disease, but precludes the possibility of maintaining cleanliness and neatness in the tenement-house localities.

— One of those blood-curdling sensations with which the newspapers delight to entertain the community has just been exploded by the prompt action of the health authorities. Word having been sent to the husband of an inmate of the female insane asylum on Blackwell's Island that she was dying, he concluded to remove her to his home in the lower part of the city; but as he was in a state of intoxication when he reached the island, he was refused permission to do so. Still persisting in his determination, however, he returned when sober, and took his wife away, although warned that she would probably die before she reached her destination. As she was much emaciated and there were spots of purpura upon her body, he got it into his head that she had been starved, beaten, and otherwise maltreated while in the institution, and called in the services of a physician of the neighborhood, who had only recently moved to New York, and who very foolishly allowed himself to be influenced by the man's story. She died very shortly, and accompanying the certificate, which stated that the cause of death was inanition, the physician sent a note to the health department, intimating that this was due, in part at least, to the bad treatment which she had received in the asylum. The deputy register of vital statistics, Dr. Nagle, at once placed the case in the hands of the coroner, who, with a jury principally composed of well-known physicians, made a careful investigation of the whole matter. The result demonstrated that the woman had received the best of treatment during her sojourn on the island, and that her death had occurred from purely natural causes. At the inquest it was shown that she had long been suffering from general paralysis and uncontrollable

diarrhœa, and the autopsy proved that death had been due to chronic meningitis, with effusion into the ventricles and softening of the brain. No marks of violence of any kind were found, nor were there any evidences whatever of starvation. Consequently, the verdict of the jury declared that the charges which had been made against the institution were not sustained.

— Of late the members of the vaccinating corps of the board of health have been visiting the various station-houses of the city at night, for the purpose of vaccinating the tramps and other vagrants accustomed to seek lodgings there. The city has been so entirely free from small-pox for the last two years that it is certainly desirable that every precaution should still be taken to keep it away from the community.

PHILADELPHIA.

— At the County Medical Society, Dr. Cheston Morris recently presented a paper on Cow's Milk as Food for invalids and in health. His conclusions were that pure, fresh milk is not to be obtained from the "milkmen." He advocated the adoption of a plan that has been in successful operation in New York for three years, under the charge of a Mr. Leister, who proposes to put the milk in quart jars at the dairy, which are then hermetically sealed and delivered to the customers, the empty vessels being collected each morning. This plan eliminates all the chances of adulteration, skimming, or watering by middle-men, and will undoubtedly meet general approval.

CHICAGO.

— Three weeks ago the West Chicago Medical Society passed a resolution declaring its opinion of the duty of the State Board of Health to be to procure an amendment to the law relating to the collection of vital statistics, providing for a compensation for the reporting of births and deaths. At the next meeting of the Chicago Medical Society a similar resolution was passed unanimously. The attention of the profession throughout the State has been called to the matter by circular, and the scheme is meeting with much more general favor than any member of the society had expected. The president of the State Board, Dr. Wardner, has written a letter in which he gives the move his unqualified indorsement, and says he will lay the matter before the board at the next meeting. The labor of procuring an amendment to the law at the hands of the legislature, with the great press of other business which that body is loaded with, is not a small one, and although every physician in the State might petition for such an amendment, it would not necessarily follow that it could be passed.

The ground on which such legislation is asked is the double one that it is unjust to ask physicians to be gatherers of vital statistics for the State without compensation, and that under the present system such statistics are and must be imperfect and unreliable. Every week, nearly, here in Chicago, some physician is heard to say that he does not report any births occurring in his practice; that he cannot be compelled to, and that he simply does not care to. If the feeling of the profession of Chicago is a fair measure of that of the profession of the State, and if accuracy of statistics is to depend on the disaffected ones being compelled by process to make reports, it will perhaps never be

attained. Perfect statistics will depend on unanimous coöperation of the profession in the work.

— Dr. C. W. Earle recently reported a very instructive case of intussusception in an adult that resulted in death, and that was not suspected until revealed by the post-mortem examination. The patient was a women of thirty-two years of age, who had been previously generally vigorous. She was peculiar in her organization in being insusceptible to pain. A few months before the present sickness she had been delivered of her first child by forceps with great difficulty, and yet experienced no pain whatever.

For more than a week before she went to bed with this illness she had complained of slight pains in the epigastrium, most after eating, and had taken for them some simple remedy, they being supposed to be due to indigestion. As she grew worse the doctor was sent for, who gave cathartics to relieve a condition of some constipation. In two or three days these operated freely and fully, at least two large battery stools, following some smaller ones of hard masses, were voided. But the pains did not entirely disappear, and vomiting began, persisted, and was frequent. Once something like stercoraceous matter came up. No fever or tenderness in the abdomen occurred and the mind was clear. Great depression and finally collapse ensued. Digital examination of the vagina revealed a tumor in front of the uterus pressing that organ and the bladder firmly downward. Even this was not tender. Before death the view taken of the case by the attendant and Drs. Byford and Fitch in consultation was that an internal hæmorrhage, possibly pelvic, had taken place, and was causing the prostration.

The examination of the dead body revealed an intussusception of the small intestine a few inches above the ilio-cæcal valve. There was no other lesion of any kind; no adhesions except within the intussusception. The infolded mass was about six inches long.

— Dr. Cornelius A. Logan, recently appointed minister to Central America, has been a resident of Chicago and engaged in practice since his return from the mission to Chili, upwards of two years ago. Whatever his capacity as a United States minister may be, those of the profession here who have made his acquaintance are sure that in his departure we lose a high-minded and cultivated physician and a very genial gentleman.

WASHINGTON.

— The special committee of the United States senate to investigate and report upon the best means of preventing the introduction and spread of epidemic diseases is composed of the following: Harris of Tennessee (chairman), Lamar of Mississippi, Garland of Arkansas, Jonas of Louisiana, Paddock of Nevada, Sharon of Missouri, Platt of Connecticut. This committee has already had several bills and resolutions referred to it, as: —

Senate bill 55, to authorize the secretary of the treasury to construct a refrigerating ship for the disinfection of vessels and cargoes.

Senate bill 108, to prevent the introduction of contagious or infectious diseases.

Senate resolution 9, requesting Drs. Bemiss and Cochran and Engineer

Hardie to complete their reports upon the yellow fever epidemic of 1878, for the use of Congress.

In the house, a committee with similar powers and scope to those of the senate has been asked for by Young of Tennessee, and Cox of New York, and will probably be appointed at an early date.

— Dr. Jas. F. Harrison, of Virginia, has petitioned Congress for the removal of his political disabilities.

ST. LOUIS.

— A case of hernia vaginalis anterior, with an operation resulting in a radical cure, was reported at the last meeting of the St. Louis Medical Society. It is thought that there is no similar case on record. The woman was about twenty-five years of age. She had given birth to two children. The hernia came down, a little in front of the neck of the womb, into the vagina, occasionally protruding from two to three inches beyond the vulva. It was diaphanous, and its contents were easily recognized as a loop of the small intestines. Dr. G. M. B. Maughs, of this city, was called to see the case by Dr. Paul F. Eves. Sims's operation of elytrorrhaphy for procidentia was performed by Dr. Eves, who then left the city. The irritation of the wound seems to have produced sympathetic coughing, for a cough at once set in, which prevented the union of the denuded surfaces. This measure was tried three times, however, but always failed from apparently the same cause. This plan having had a fair trial, and the woman feeling that she would die unless a successful operation was performed, Dr. Maughs carefully removed the mucous membrane which covered the hernia, denuded the wall of the vagina for about a quarter of an inch around the opening through which the intestines had descended, and also freshened about an eighth of an inch of the hernial canal. The freshened surfaces were then joined by a quill suture, placed transversely to the axis of the vagina; the surfaces brought in contact were nearly half an inch in width. Superficial sutures were also used. In about twenty-four hours the quill sutures suppurated out. (This was before the days of carbolic acid.) In ten or twelve days the superficial sutures were removed, and the patient discharged, well. Seven years afterward Dr. Marion Sims saw the case, and took full notes of it. The woman was in perfect health; since the operation she had given birth to two children, and the only evidence of her former affliction was a narrow white line crossing the anterior wall of the vagina.

SANTA BARBARA, WITH REMARKS ON CALIFORNIA.[1]

Mr. Editor, — Having passed the last winter in Santa Barbara, I had an opportunity of witnessing the wonderfully beneficial influence of the open-air life in that region upon invalids, especially consumptives, though the rainy season was one of exceptional severity. There is, however, urgent need of more careful discrimination by the profession in sending cases thither. I knew a young gentleman sent out by a leading surgeon of Philadelphia. He left a wife and child, and went alone, though in an advanced stage of consumption.

[1] Read before the Suffolk District Medical Society.

He bore the journey badly, and after a life of misery there hastened home. I knew a gentleman sent thither by a distinguished Fellow of this society. He too was far gone in consumption, and should never have left his home. As a rule, patients should go early in the course of their disease, and be prepared to make a long stay. But I do not wish to be understood as advising that no hopeless cases be sent. There are exceptional instances in which one has independent financial means, and can be accompanied by those most dear to him, so as to have the comforts of a home; then life may be prolonged, and death made easy. It is difficult to define a hopeless case, for many which are apparently hopeless will recover there. But it is certain that many go to their own injury, and the profession should pay more attention to the patients' circumstances aside from their physical condition.

During the winter more than thirty inches of rain fell in the town of Santa Barbara, and several inches more in the country around. Two years of drought had preceded these rains, and caused much poverty. The adobe houses of the Spaniards, when properly built, with verandas and cemented floors, are well-suited to this semi-tropical climate. But many of these houses are not properly built. From these causes diphtheria and typhoid fever prevailed extensively among the poorer Spaniards, but, I believe, were exclusively confined to that part of the population. In a newspaper published in Santa Barbara, of which a copy has just reached me, is given the testimony of physicians and others as to the unusual physical development of children, and their freedom from diseases, especially croup and gastro-intestinal affections. My observations confirm these statements. There are in Santa Barbara well-educated and reliable practitioners of medicine. There are others who are both ignorant and unscrupulous. Having known most deplorable results from the frequency with which patients fall into the hands of the latter class, I recommend that physicians in sending patients thither assist them in advance in the choice of their future medical attendant. Well-qualified pharmacists, with well-appointed drug stores, are to be found, but, as in the choice of a physician, one must be on his guard against gross incompetency.

If I were to return to Santa Barbara, I should go by way of the Chicago, Burlington, and Quincy route from Chicago to Council Bluffs, from Omaha to Ogden by the Union Pacific, and from Ogden to San Francisco by the Central Pacific. The train moves very slowly across the plains and alkali desert, and the journey from Boston to San Francisco now occupies seven days. Arrangements are expected soon by which the journey will be made in six days. To go by Pacific mail steamships is somewhat less expensive. The journey from San Francisco to Santa Barbara, two hundred and eighty miles, is made on the coastwise steamers, of which the most comfortable are the Orizaba, Senator, and Ancon (side-wheeler). One will add materially to his comfort by providing himself with a hamper of eatables for the trip along the coast.

The city of Santa Barbara nestles down in a valley between the Santa Ynez range of mountains, with their foot-hills, and the sea. It is forty miles from Point Concepcion, and thirty from the town of San Buena Ventura. It is built on an inclined plain, which slopes upward from the sea and faces nearly

directly southward. Snow never crosses the green foot-hills into the little valley, and frost is rarely known. The two predominant native trees are the live-oak, which dots the neighboring hills, and the sycamore. The eucalyptus globulus, the so-called blue-green tree of Australia (though it really came from Tasmania), has been planted in and about the town, and grows with astonishing rapidity. Roses bloom luxuriantly the year round, callas in thick clusters, the showy Pampas plumes, and various tropical trees. I have never seen elsewhere such handsome fuchsias.

When I visited Santa Barbara, in the winter of 1877–78, the population was estimated (perhaps overestimated) at six thousand, — four thousand whites, the rest Spaniards, Mexican half-breeds or "greasers," and Chinese. In 1870 there were thirty-five white inhabitants, and the town was almost unknown east of the Rocky Mountains. Santa Barbara is a winter resort. The rainy season begins usually in October or November, and continues till May. The average rain-fall is fourteen inches. The rain brings out the rich verdure, and in the intervals between the rains one can enjoy the bright, sparkling weather. I have bathed in the sea every month of the rainy season, from December to May inclusive. At the end of the rainy season come the fogs, lasting throughout the forenoon, or more rarely all day. Then the invalids depart to visit the magnificent Ojai valley, carpeted with a rich flora, to the Yosemite, or to their homes. The chief amusement is horseback riding. A well-trained mustang can be obtained at any time for twenty-five or thirty dollars. They are controlled by the Spanish bit, often cruelly abused. Barley enough to feed him a month can be obtained for six dollars. Except occasionally, in the wettest weather, the roads are excellent. The Arlington Hotel is a commodious and well-kept house, so constructed as to give the largest possible number of sunny rooms. In California a sunny room is essential to health and comfort. The contrast between sunshine and shade is very marked. The charges at the Arlington Hotel are moderate. If one chooses to keep house he will find it costs about the same as here to supply a table. Groceries cost double what they do here; meats, including game in season, are sold at a moderate price, and vegetables are very cheap. Vegetables are raised in an Italian garden, but are commonly obtained from Chinamen, who bring them to the door. I know a family of three whose table is plenteously supplied with vegetables for seventy-five cents a week. There are good schools, public and private, churches of various denominations, two banks, and a theatre, owned by Signor Lobero, a retired Italian opera manager. The climate of Santa Barbara is most equable, the difference between the highest and lowest temperature in the year being but forty degrees of Fahrenheit. This equability is doubtless due to its proximity to the sea and its sheltered position. The coast range shelters it from cold northerly winds, while the Santa Barbara Islands protect it from the opposite quarter. In the coldest weather a small wood fire is necessary morning and evening. It would perhaps be proper to speak of the climates of Santa Barbara. Some invalids will do best near the Mesa, a table-land near the sea. Others find higher and dryer localities more beneficial. Immediately after sunset a cold wave of atmosphere occurs, and continues about an hour, to be followed by greater warmth. There is no malaria in the town or its environs.

The bathing season begins in May and continues all summer. The bathing facilities are excellent. Connected with one of the bath-houses are convenient arrangements for sun-baths, and I have known a tuberculous patient to derive much benefit from them.

The Spanish women are usually attended in confinement by midwives. Some of my medical friends were called late to one of these cases. The membranes had long been ruptured; a shoulder presented, and was crowded into the pelvis. They succeeded in performing version, but the child was dead. The Spaniards are strongly opposed to post-mortem examinations.

The best description of Santa Barbara ever published is from the pen of Albert F. Webster, and appeared in *Appleton's Journal*. Santa Barbara as a health resort has its disadvantages. It is a long distance from an Eastern home, — longer than the visitor may realize till he has made the journey. For eight days during the past winter communication by mail with the East was interrupted, and during a shorter period by telegraph. Occasionally a dust storm arises, which is intensely disagreeable. I have known a few raw, windy days, much like our own March weather. The opportunities for shopping are very inferior, and many persons obtain their clothes, even boots and shoes, by mail from the East. The prevailing diseases on the Pacific coast seem to be rheumatism, neuralgia (especially sciatica), and nasal catarrh. A friend, for the last twelve years an oculist in San Francisco, tells me he has met in his practice a large proportion of cases of episcleritis. A physician of San Buena Ventura, and lately of Philadelphia, finds uterine disease exceedingly prevalent, and attributes its frequency chiefly to too early rising after parturition. The same class of diseases appear to be common in San Francisco and Oakland, and in those cities criminal abortions and the employment of midwives must be powerful factors in their production.

My knowledge of California is chiefly derived from visiting four places, differing widely in climate and the character of their inhabitants: San Buena Ventura, the centre of an agricultural region, with a settled population; Santa Barbara, whose population is largely transient and invalid, and where the active interests of the place are rather horticultural than agricultural; San Francisco, a cosmopolitan city, whose climate in the spring and summer, when the trade-winds blow and the fogs roll in, is very severe; and Oakland, a city of residences, with a climate far milder than the neighboring metropolis.

EDWARD L. PARKS.

SHORT COMMUNICATIONS.

FRENCH QUARANTINE.

A. *Sanitary Measures applicable to the Prevention of the Plague at the Mediterranean Ports.* — (1.) Suspected vessels (Article 36 of General Directions) — that is to say, having no actual case of plague on board during the voyage — are submitted to a quarantine in a lazaret. For these cases a quarantine of observation of five to ten entire days, either in the lazaret or on board of the troop-lazaret, is insufficient. The unloading, the disinfection of wearing apparel or of materials susceptible of retaining infection, is obligatory. The quarantine of persons remaining on board during the discharge of the cargo is from five to ten days, and does not commence until after the disinfection of the ship is terminated. (2.) For vessels

which have, or which have had, cases of plague on board (Article 36 of General Directions), if there be any sick, they are immediately disembarked to the lazaret; those not sick are subjected to a quarantine of ten to fifteen days, dating from their entry to the lazaret. The quarantine of persons remaining on board is from ten to fifteen complete days, and, as in the previous case, does not commence before the completion of the disinfection of the ship.

B. *Measures applicable to the Prevention of the Introduction of the Plague in the Channel Ports.* — Suspected ships (Article 36) — that is to say, not having had any case on board during the passage — are submitted to a quarantine which, if possible, is passed in a lazaret. The quarantine of observation is from three to five complete days, either on board or in hospital. The disinfection of wearing apparel, etc., of articles susceptible of infection, etc., and of the vessel is obligatory. The quarantine of persons remaining on board during the unloading commences only after the disinfection of the vessel, and lasts from three to five days. (2.) For infected vessels the regulations are the same as for those entering Mediterranean ports.

American Medical Association. — The thirtieth annual session will be held in the city of Atlanta, Georgia, commencing on Tuesday, May 6, 1879, at eleven o'clock, A. M.

Sections. "The chairmen of the several sections shall prepare and read in the general sessions of the association papers on the advances and discoveries of the past year in the branches of science included in their respective sections." . . . By-Laws, Art. II., Sect. 4.

Practice of Medicine, Materia Medica, and Physiology: Dr. Thos. F. Rochester, Buffalo, N. Y., chairman. Dr. W. C. Glasgow, St. Louis, Mo., secretary. Committees appointed to report to this section: On Clinical and Meteorological Records, Dr. N. S. Davis, Illinois, chairman. Effect of Climate in Colorado on Pulmonary Phthisis, Dr. C. Denison, Col., chairman.

Obstetrics and Diseases of Women and Children: Dr. E. S. Lewis, New Orleans, La., chairman. ——— ———, secretary.

Surgery and Anatomy: Dr. Moses Gunn, Chicago, Ill., chairman. Dr. J. R. Weist, Richmond, Ind., secretary.

Medical Jurisprudence, Chemistry, and Psychology: ——— ———, chairman. Dr. L. M. Eastman, Baltimore, M. D., secretary.

State Medicine and Public Hygiene: Dr. John S. Billings, Washington, D. C., chairman. Dr. J. T. Reeve, Appleton, Wis., secretary.

Ophthalmology, Otology, and Laryngology: Dr. H. Knapp, New York, chairman. Dr. X. C. Scott, Cleveland, Ohio, secretary.

The following committees are expected to report: On Prize Essays, Dr. Robert Battey, Rome, Ga., chairman. On Necrology, Dr. J. M. Toner, Washington, D. C., chairman. On Catalogue of National Library, Dr. H. C. Wood, Philada., Pa., chairman. On Recommendations in President Richardson's Address, Dr. T. G. Richardson, New Orleans, La., chairman. On Ozone, Dr. N. S. Davis, Chicago, Ill., chairman. On Sanitaria for Consumptives, Dr. H. I. Bowditch, Boston, Mass., chairman. On Dr. Seguin's paper on the Intervention of Physicians in Education, Dr. R. J. O'Sullivan, N. Y., chairman.

Changes in plan of organization to be acted upon: —

Offered by Dr. J. M. Keller, Ark. Plan of Organization, Art. IV., Sect. 1. In future the committee on nominations shall present the name of no person for appointment or election to office or position save on the committees on necrology and climatology, unless the party nominated be in attendance on the association at the time.

Offered by H. O. Hitchcock, Mich. Plan of Organization, Art. IV., Sect. 1. The several state, army, and navy delegations, including delegates and permanent members, shall, on the first day of the annual meeting of this association, at a meeting publicly called for that purpose, nominate candidates for the several offices of president, vice-presidents, and chairmen for the several sections, and shall choose one of their number to act on the nominating committee of the association, with power to cast as many votes in that nominating committee as there are members of the delegation of which he is a member. Candidates for the several offices above named to be reported to the association shall be selected from the names reported to the committee of the several state delegations.

Offered by Dr. A. N. Bell, N. Y. By-Laws, II. Sections. Consolidate Section 4, on medical jurisprudence and psychology, and Section 5, on state medicine and public hygiene, and call it Section 4.

Offered by Dr. J. J. Caldwell, Md. By-Laws, II. Sections. Form an additional section, to be known as the section on neurology and electrology.

Offered by Dr. T. Clay Maddux, Md. By-Laws, II. Sections. Form an additional section on diseases of the genito-urinary organs, including syphilis and dermatology.

Offered by N. S. Davis, as chairman of a committee. "Code of Ethics." Art. I., paragraph 1, add, "And hence it is considered derogatory to the interests of the public and the honor of the profession for any physician or teacher to aid, in any way, the medical teaching or graduation of persons knowing them to be supporters and intended practitioners of some irregular and exclusive system of medicine."

"It shall be the duty of every member of the association who proposes to present a paper, or report to any one of the sections, to forward either the paper or a *title* indicative of its contents and its *length* to the chairman of the committee of arrangements at least one month before the annual meeting at which the paper or report is to be read. It shall be the duty of the chairman and secretary of each section to communicate the same information to the chairman of the committee of arrangements concerning such papers and reports as may come into their possession or knowledge, for their respective sections, the same length of time before the annual meeting. And the committee of arrangements shall determine the order of reading or presentation of all such papers, and announce the same in the form of a programme for the use of all members attending the annual meeting."

Wm. B. Atkinson, M. D., Permanent Secretary.

Philadelphia, 1400 Pine Street, S. W. corner Broad.

Appointment. — Dr. J. B. Swift has been appointed port physician in place of Dr. Wallace, resigned. The resignation takes effect April 15th.

Books and Pamphlets Received. — Health Primers. No. 6. Baths and Bathing. New York: D. Appleton & Co. 1879.

Chemistry, General, Medical, and Pharmaceutical, including the Chemistry of the United States Pharmacopœia. A Manual on the General Principles of the Science and their Applications in Medicine and Pharmacy. By John Attfield, M. A., Ph. D., of the University of Tübingen. Eighth edition, revised by the author. Philadelphia: Henry C. Lea. 1879.

Ringworm in Public Institutions (American Medical Association), and Rosacea. By John V. S. Shoemaker, A. M., M. D. 1878.

Atlas of Skin Diseases. By Louis A. Duhring, M. D., Professor of Skin Diseases in the Hospital of the University of Pennsylvania. Part V. Philadelphia: J. B. Lippincott & Co. 1879.

The Non-Asylum Treatment of the Insane. By William A. Hammond, M. D. New York: G. P. Putnam's Sons. 1879.

In Memoriam. Eli Geddings Charleston, S. C. 1879.

The Second Annual Report of the Board of Trustees of the Western Pennsylvania Institution for the Deaf and Dumb. Pittsburgh. 1879.

Transactions of the American Medical Association. Vol. XXIX. Philadelphia: Printed for the Association. 1878.

Ueber einige Krankheitsfälle und deren stellung zum Blattern, Masern, Scharlach, und Diphtheritis-Contagium. Von Dr. Thom. Sidlo. Wien. 1879.

Proposed Legislation on the Adulteration of Food and Medicine. By Edward R. Squibb, of Brooklyn. (Reprint.) Notes in reply to Criticisms of the Press. New York: G. P. Putnam's Sons. 1879.